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THE

CONCHOLOGIST'S TEXT-BOOK.

Brown, Capt. Thomas

THE

CONCHOLOGIST'S TEXT-BOOK,

EMBRACING THE ARRANGEMENTS OF

LAMARCK AND LINNÆUS,

WITH A GLOSSARY OF TECHNICAL TERMS.

TO WHICH IS ADDED

A BRIEF ACCOUNT OF THE MOLLUSCA.

Seventh Edition.

CORRECTED AND ENLARGED

BY WILLIAM MACGILLIVRAY, ESQ.,
PROFESSOR OF NATURAL HISTORY IN MARISCHAL COLLEGE, ABERDEEN.

ILLUSTRATED BY ENGRAVINGS ON STEEL.

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PUBLISHERS' ADVERTISEMENT TO THE SIXTH EDITION.

THE CONCHOLOGIST'S TEXT-BOOK, of which a revised and improved edition is now offered to the Public, has been so favourably received as to have passed through five editions since its first appearance in 1833. In the present edition—the Sixth—several alterations have been made on the translations of Lamarck's generic and specific characters; the descriptive portion has been revised, and a chapter on the Mollusca, with two illustrative plates, has been added from the 'Elemens de Zoologie' of M. Milne Edwards. For these, and any other alterations on, or additions to, the text of preceding editions, the editor of the present edition, Professor MACGILLIVRAY, is alone responsible.

PREFACE.

The study of Conchology has, by many, been considered as trifling, and tending to no useful purpose; but such an opinion could emanate only from persons ignorant of its great importance in a geological point of view: fossil shells, coral, and wood, with other organic remains, being the only true remaining Medals of Creation—as Bergman elegantly expresses himself. These often retain the exact figure of their primitive state. By their aid, therefore, we are enabled to identify strata, both of the older and more recent formations, that may present themselves to view in different parts of the globe. Few of these fossil species now exist in a living state, most of them having perished in the wreck of the former world. "By these medals," says Parkinson, "we are taught, that innumerable beings have lived, of which not one of the same kind does any longer exist; that immense beds, composed of the spoils of these animals, extending for many miles under ground, are met with in many parts

of the globe; that enormous chains of mountains, which seem to load the surface of the earth, are vast monuments in which these remains of former ages are entombed; that, though lying thus crushed together, in a rude and confused mass, they are hourly suffering those changes, by which, after thousands of years, they become the chief constituent parts of gems,—the limestone which forms the humble cottage of the peasant, —or the marble which adorns the splendid palace of the prince." From the connected examination of fossils, and of the strata which contain them, much valuable information may be expected to be obtained respecting situations in which useful substances may be found.

To trace the structure, and investigate the uses, of animals which inhabit shells, is not the least amusing and instructive part of the study of Conchology. As the Almighty has formed nothing in vain, these creatures, so low in the scale of being, must have particular uses allotted them in the plan of creation.

Conchology has ever been a favourite pursuit, from the beauty and elegant structure of shells, and the ease with which they can be preserved.

The method of Lamarck, the father of modern Conchology, is the basis of the following pages; only that, instead of describing the lowest or least organized beings first, as he has done, we have pursued the descending

scale, and enlarged his system by the additional genera of other Testaceologists. The arrangement of Lamarck is strictly preserved in the orders and families, and the new genera have been placed as nearly as possible in the situations which they would naturally occupy in his system.

The Linnæan arrangement was long followed as the best, and is still adopted by many naturalists. Since his time, however, the immense accumulation of new species, with characters which are likewise new, renders the task of classifying them according to his method, extremely difficult, if not impracticable. We have, nevertheless, given his arrangement, as well as that of the modern school, leaving it to the decision of the student which he will adopt.

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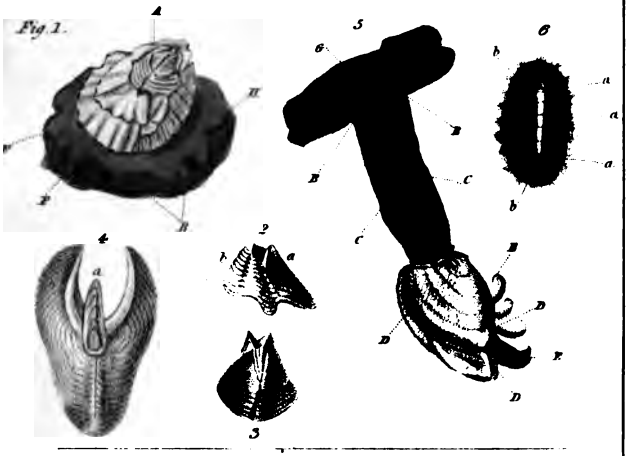
Multivalve



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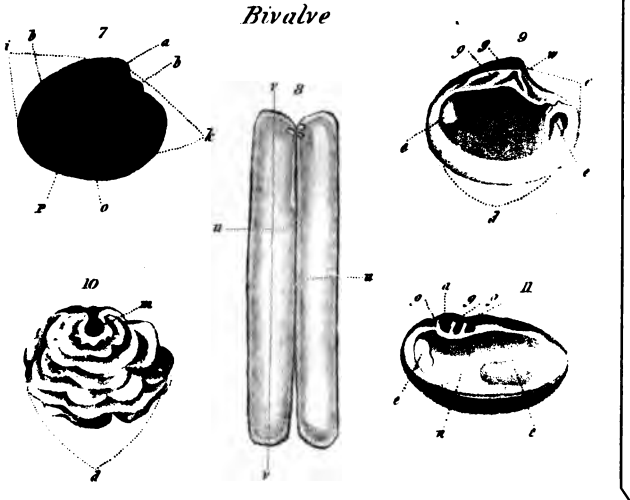

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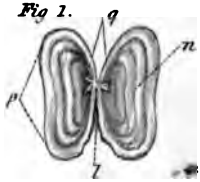
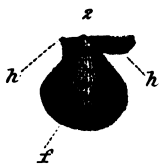
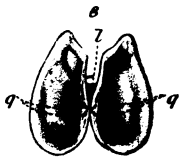
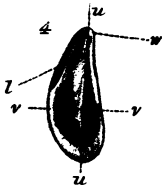
Parts of Shells.

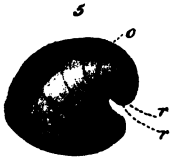
Bivalve











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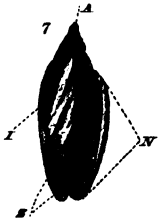

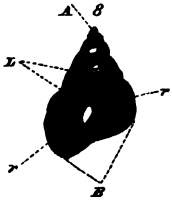

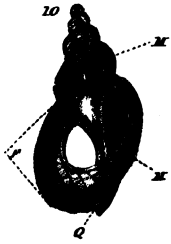

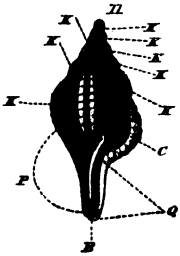

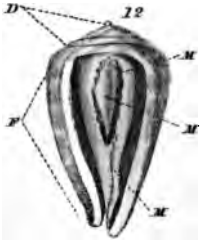

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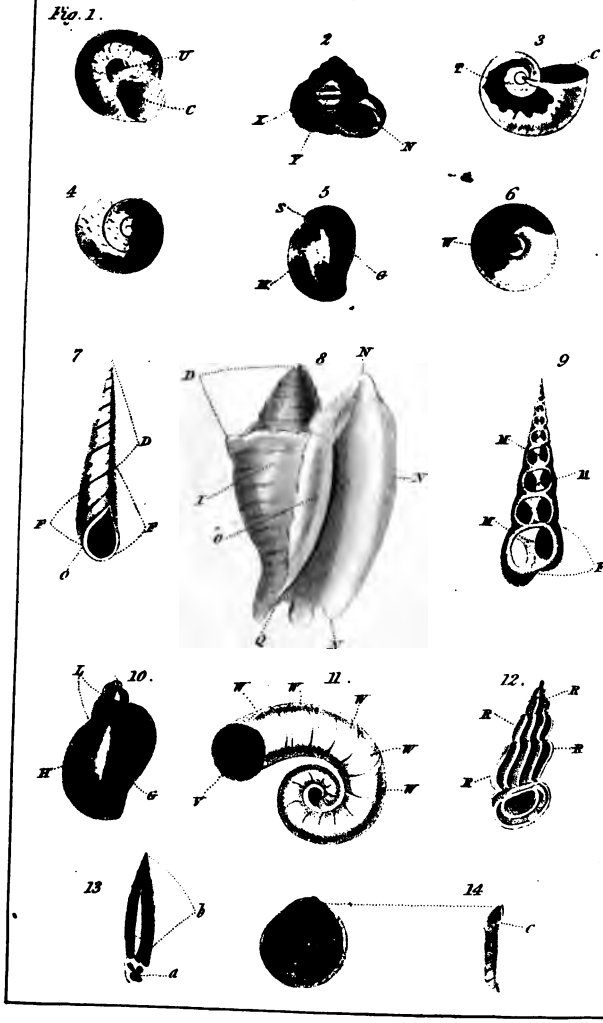

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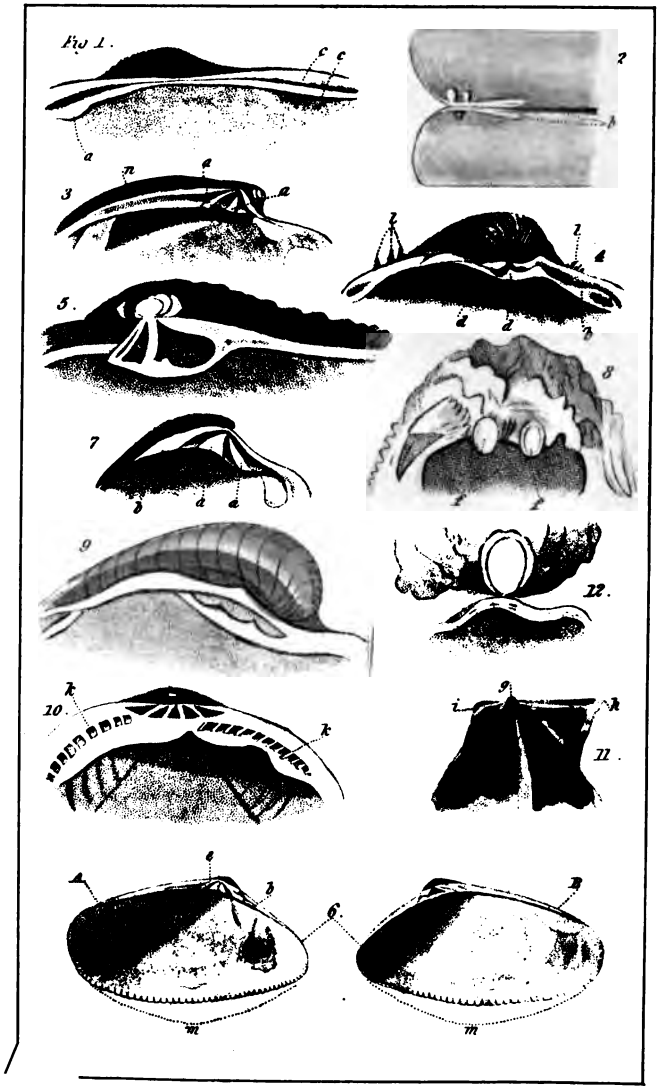

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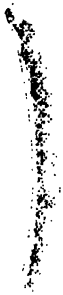

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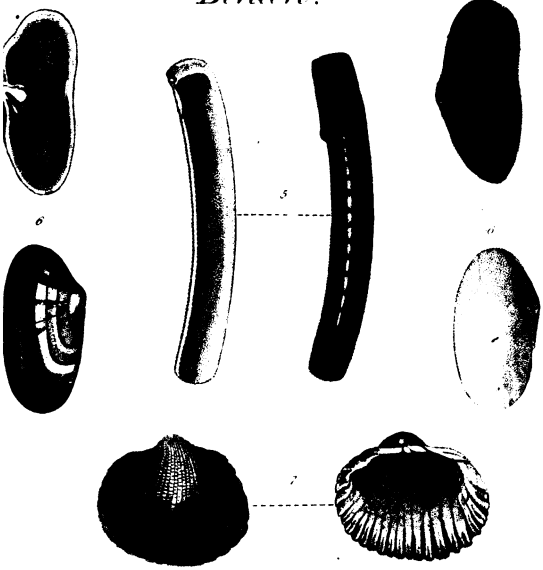

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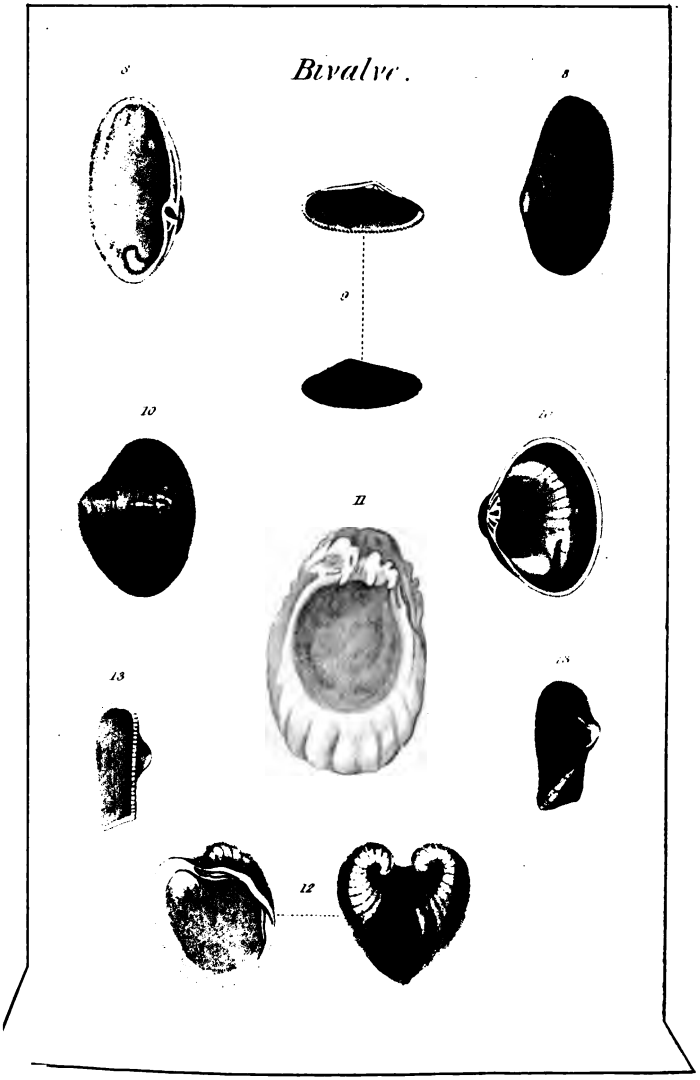

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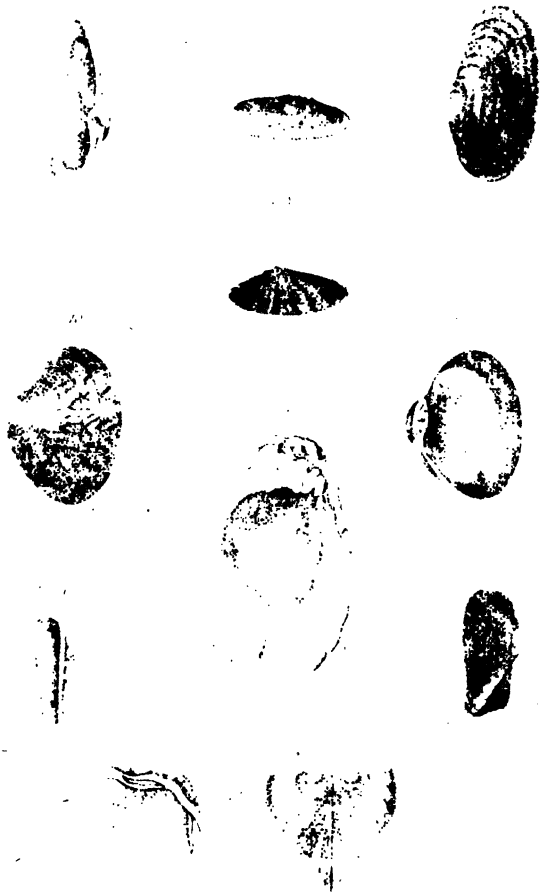

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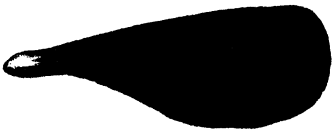

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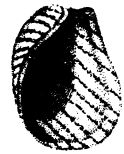

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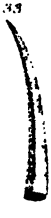

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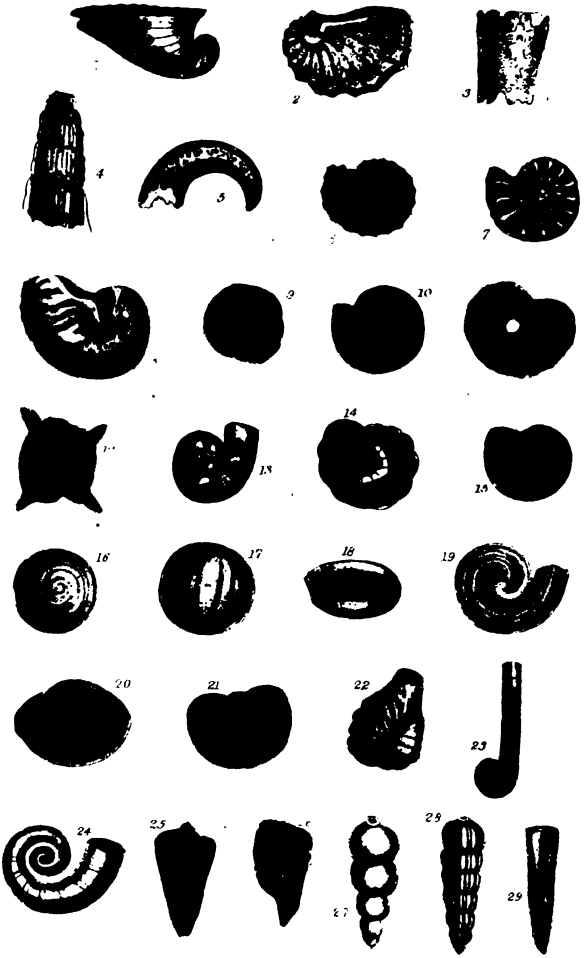
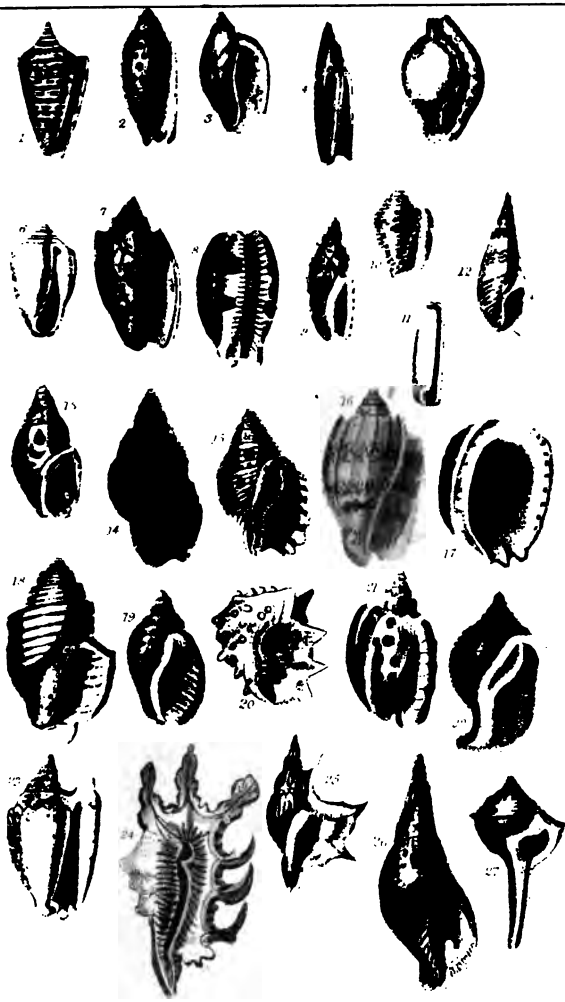


1 *Fragile Carinaria.* 2 *Argus Argonauta.* 3 *Faujas's Baculites.* 4 *Ribbed Turrilites.* 5 *Glossy Ammoceratites.* 6 *Striated Orbulites.* 7 *Armed Ammonites.* 8 *Umbilicated Nautilus.* 9 *Flat Nummulites.* 10 *Creased Vorticialis.* 11 *Wrinkled Polystomella.* 12 *Chalk Siderolites.* 13 *Vesicular Discorbis.* 14 *Star-shaped Placentula.* 15 *Rolled Lenticulina.* 16 *Trochus-shaped Rotulites.* 17 *Round Mellonia.* 18 *Oval Miliola.* 19 *One-sinused Orbiculina.* 20 *Scaled Cristellaria.* 21 *Lid-shaped Renulina.* 22 *Nautilus-shaped Lituola.* 23 *Club-shaped Spirolina.* 24 *Perons Spirula.* 25 *Pyramidical Conilites.* 26 *Bent Hippurites.* 27 *Shining Nodosaria.* 28 *Radish Root Orthocera.* 29 *Subconic Belemnites.*



1 *General Conus.* 2 *Bloody Oliva.* 3 *Cinnamon Ancillaria.* 4 *Awl-shaped Terebellum.* 5 *Egg-shaped Ovula.* 6 *Bluish Marginella.* 7 *Bat Voluta.* 8 *Measley Cypræa.* 9 *Pontifical Mitra.* 10 *Merchant Columbella.* 11 *Cylindric Volvaria.* 12 *Filleted Terebra.* 13 *Ceylonese Eburna.* 14 *Waved Buccinum.* 15 *Partridge Dolium.* 16 *Roseate Harpa.* 17 *Peruvian Concholepas.* 18 *Banded Monoceros.* 19 *Persian Purpura.* 20 *Rugged Ricinula.* 21 *Patched Cassis.* 22 *Thyrrene Cassidaria.* 23 *Diana's Ear Strombus.* 24 *Knotty Pterocera.* 25 *Pelican's Foot Rostellaria.* 26 *Variegated Triton.* 27 Spiral Murex.

1 *Prickly Ranella.* 2 *Nodulous Struthiolaria.* 3 *Fig Prula.* 4 *Reticul*
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8 *Pear Turbinella.* 9 *Semi-Granulated Cerithium.* 10 *Thick-lipped M*
11 *Auger Turitella.* 12 *Childish Phasianella.* 13 *Monstrous Nerita.*
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18 *Ornamental Rotella.* 19 *Common Ianthina.* 20 *Precious Scalaria.*
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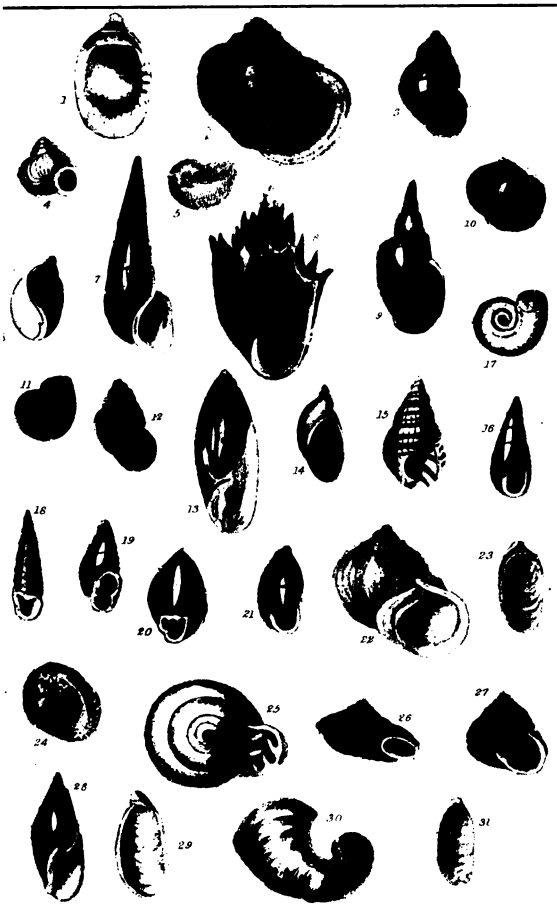

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. 9 *Pond Lymnæa.* 10 *Ditch Lutea.* 11 *Keeled Planorbis.* 12 *Elegant*
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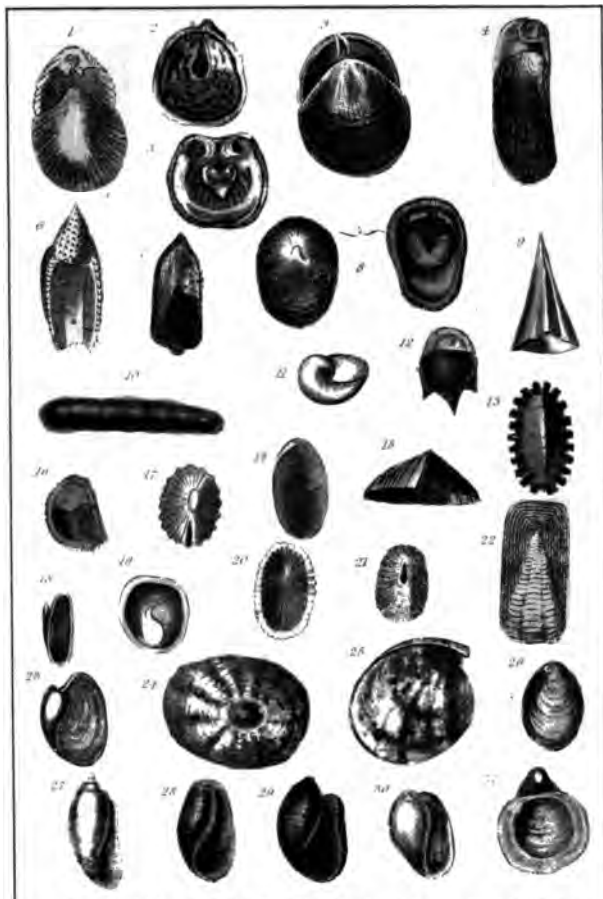

1 *Skull Terebratula.* 2 *Waved Aromia.* 3 *Placenta Placuna.* 4 *Latchet Vulsella.* 5 *Masked Crania.* 6 *Peron's Cymbulia.* 7 *Duck Lingula.* 8 *Oyster-like Discina.* 9 *Pyramidal Cleodora.* 10 *Striated Chitonellus.* 11 *Helix-like Limacina.* 12 *Three-toothed Hyalæa.* 13 *Fasciculated Chiton.* 14 *Plumed Pleurobranchus.* 15 *Common Patella.* 16 *Prickly Crepidula.* 17 *Slit Emarginula.* 18 *Oblong Ancylus.* 19 *Chinese Calyptræa.* 20 *Greek Fissurella.* 21 *Rayed Sipho.* 22 *Australian Parmophorus.* 23 *Open Bullæa.* 24 *Indian Umbrella.* 25 *Radiated Laplysia.* 26 *Feather-like Lamilaria.* 27 *Retusa Plicata.* 28 *Wood-like Bulla.* 29 *Flexible Akera.* 30 *White Diaphana.* 31 *Hungarian Pileopsis.*

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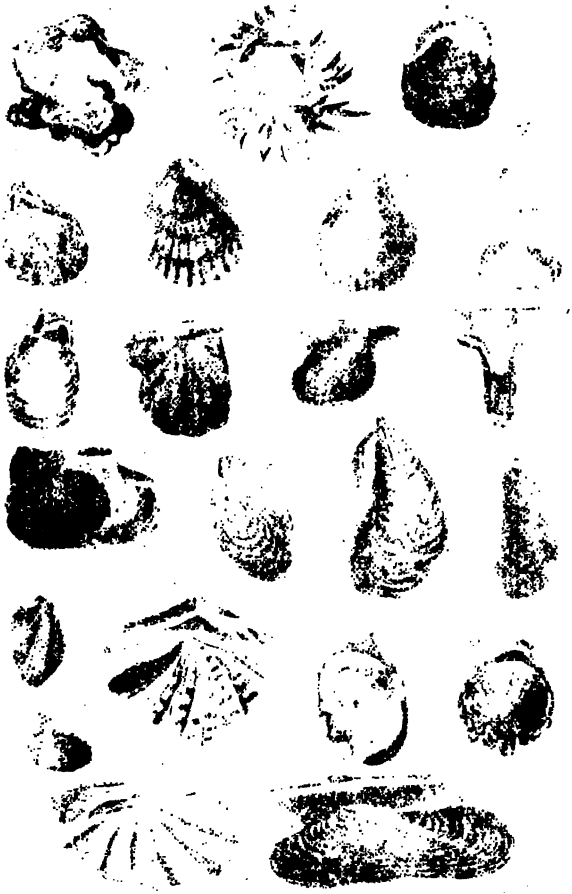
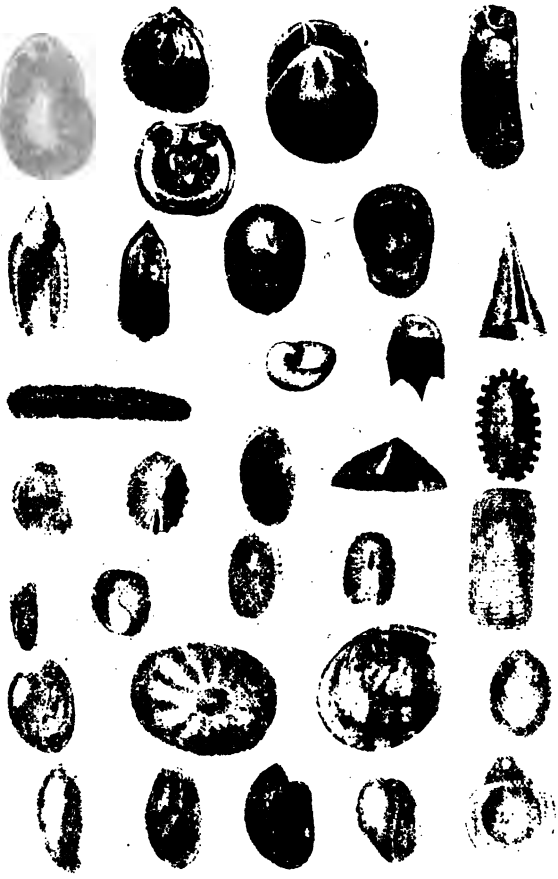


1 *Angulated Gryphæa.* 2 *Long-spined Spondylus.* 3 *Edible Ostrea.* 4 *Branched Pocatula.* 5 *Speckled Pecten.* 6 *Thorny Plagiostoma.* 7 *Glassy Lima.* 8 *Turban's Goleomma.* 9 *Spondylus-shaped Pedum.* 10 *Pearl-bearing Gelasgeria.* 11 *English Avicula.* 12 *White Malleus.* 13 *Saddle Perna.* 14 *Mussel-shaped Crenatula.* 15 *Huge Pinna.* 16 *Edible Mytilus.* 17 *Discordant Modiola.* 18 *Spotted Hippopus.* 19 *Oval Etheria.* 20 *Lazarus Chama.* 21 *Giant Tridacna.* 22 *Nile Iridina.* 23 *Oblique Pisidium.*



1 [illegible] 2 Ward Aromia. 3 Placenta Placuna. 4 [illegible] 5 Mock of Crania. 6 Perona Cymbulia. 7 Duck Lingula. [illegible] Lucina. 9 Pyramidal Cleodora. 10 Striated Chitonellus. 11 Helix-like [illegible] 12 [illegible] Hyalæa. 13 Fasciculated Chiton. 14 Plumed [illegible] Branchus. 15 Common Patella. 16 Prickly Crepidula. 17 Slit Emarginula. 18 Oblong Anoxys. 19 Chinese Calyptræa. 20 Greek Fissurella. 21 Rayed Sipho. 22 Australian Parmophorus. 23 Open Bullæa. 24 Indian Umbrella. 25 Radiated Laplysia. 26 Feather-like Lamilaria. 27 Retusa Plicata. 28 Wood-like Bulla. 29 Flexible Akera. 30 White Diaphana. 31 Hungarian Pilopsis.

1 *Angulated Gryphæa.* 2 *Long-spined Spondylus.* 3 *Edible Ostrea* 4 *Branched Plicatula.* 5 *Speckled Pecten.* 6 *Thorny Plagiostoma.* 7 *Glassy Lima.* 8 *Turton's Galeomma.* 9 *Spondylus-shaped Pedum.* 10 *Pearl-bearing Meleagrina.* 11 *English Avicula* 12 *White Malleus.* 13 *Saddle Perna.* 14 *Muscle-shaped Crenatula.* 15 *Huge Pinna.* 16 *Edible Mytilus.* 17 *Discordant Modiola.* 18 *Spotted Hippopus.* 19 *Oval Etheria.* 20 *Lazarus Chama.* 21 *Giant Tridacna.* 22 *Nile Iridina.* 23 *Oblique Pisidium.*

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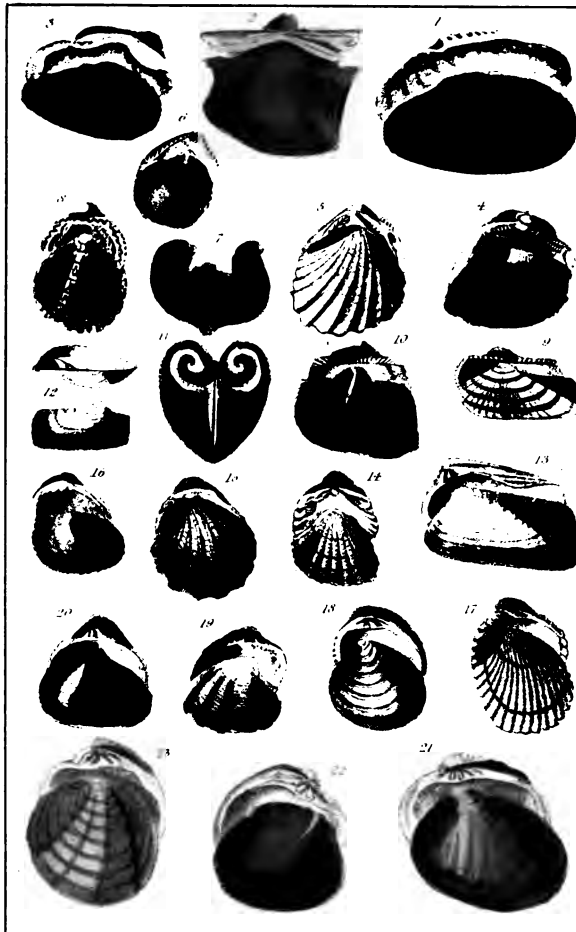

1 *Swan Anadonta.* 2 *Little Bird Hyria.* 3 *Painters' Unio.* 4 *Ambiguous Castalia.* 5 *Toothed Trigonia.* 6 *Pearly Nucula.* 7 *Ram-horned Diceras.* 8 *Delicious Pectunculus.* 9 *Noah's Arca.* 10 *Eared Cucullæa.* 11 *Heart Isocardia.* 12 *Striated Hiatella.* 13 *Guinea Cypricardia.* 14 *Edible Cardium.* 15 *Furrowed Cardita.* 16 *Red Lasæa.* 17 *Imbricated Venericardia.* 18 *Casina Venus.* 19 *Hen Ortygia.* 20 *Rayed Galathea.* 21 *Chione Cytherea.* 22 *Islandic Cyprina.* 23 *Orbicular Exoleta.*

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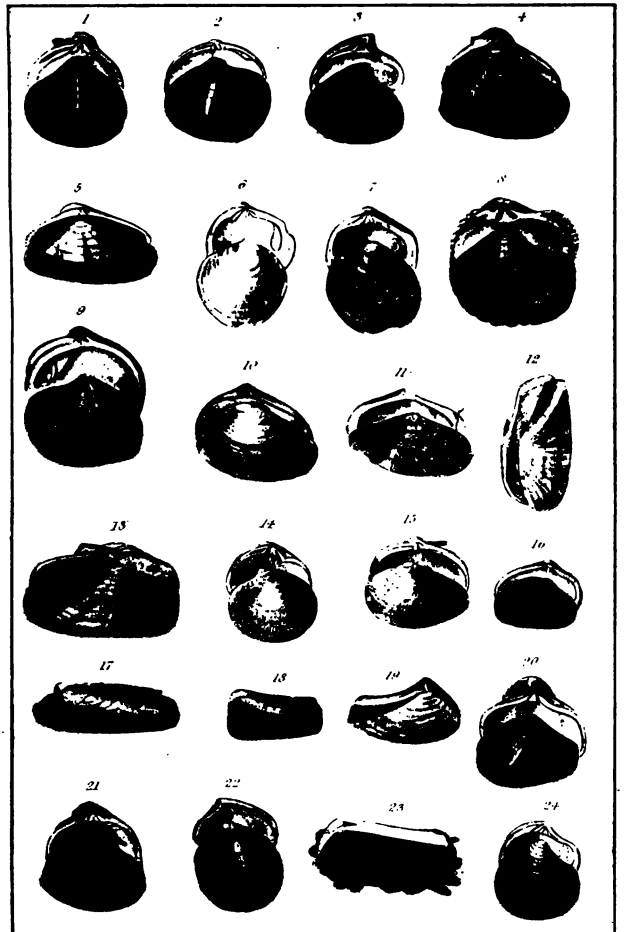

1 *River Cyrena.* 2 *Horny Cyclas.* 3 *Scottish Crassina.* 4 *Polished Capsa.* 5 *Truncated Donax.* 6 *Rounded Mysia.* 7 *Waved Lucina.* 8 *Fringed Corbis.* 9 *Thick Arcopagia.* 10 *Roseate Tellinides.* 11 *Depressed Tellina.* 12 *Variegated Psammotæa.* 13 *Faroe Psammobia.* 14 *Thin Tellimya.* 15 *Roseate Sanguinolaria.* 16 *Perforating Venerupis.* 17 *Pholas-shaped Petricola.* 18 *Abbreviated Saxicava.* 19 *Beaked Pandora.* 20 *Kernel Corbula.* 21 *Striated Erycina.* 22 *Transverse Ungulina.* 23 *Mediterranean Salemya.* 24 *Reticulated Amphidesma.*

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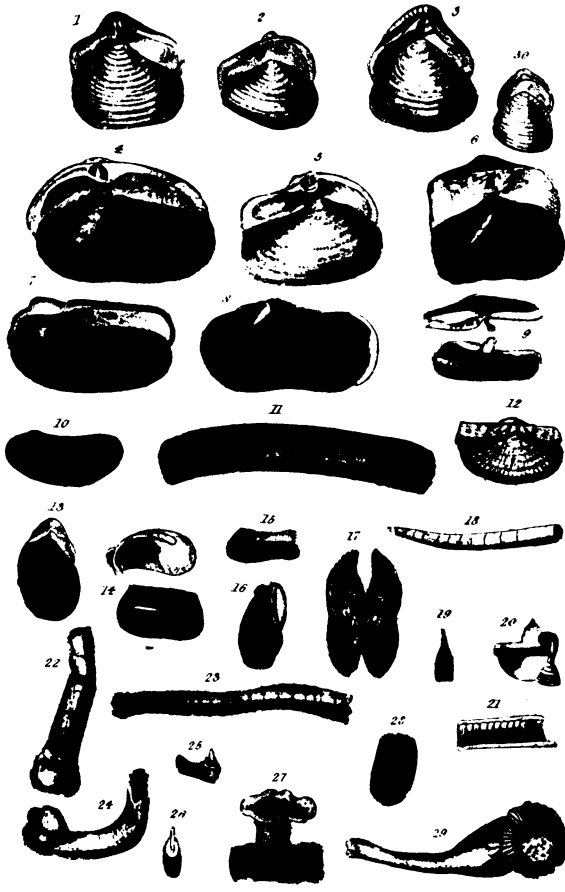

1 *King's Island Crassatella.* 2 *Very thin Ligula.* 3 *Truncated Mactra.* 4 *Oval Lutraria.* 5 *Sloping Anatina.* 6 *Truncated Mya.* 7 *Pod Glycimeris.* 8 *Aldrovandus's Panop.* 9 *Hinge of Do.* 10 *Solen-shaped Trutina.* 11 *Sabre Solen.* 12 *Striated Magdala.* 13 *Oval Crenella.* 14 *Bingham's Sphenia.* 15 *Wrinkled Pholeobia.* 16 *Modioliform Gastrochæna.* 17 *Curled Pholas.* 18 *Ship Teredo,* 19 *A terminating side valve of Do.* 20 *A bivalve of Do.* 21 *Section of anterior part of tube of Do.* 22 *Masked Teredina.* 23 *Sand Septaria.* 24 *Gregarious Fistularia.* 25 *A bivalve of Do.* *A side valve of Do.* 27 *Open Clavagella.* 28 *Face valve of Do.* 29 *Java Aspergillum.* 30 *Triangular Mactrina.*

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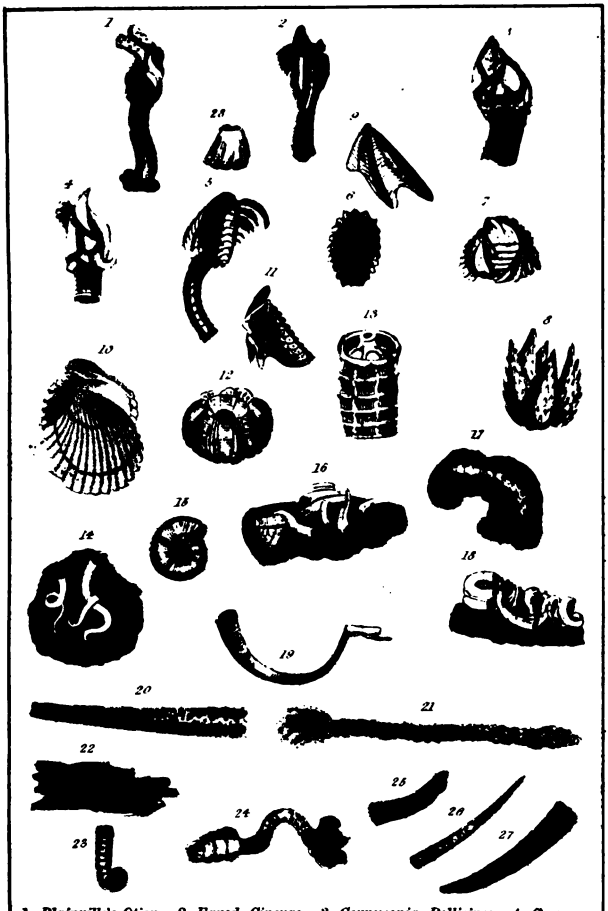

1 *Blainville's Otion.* 2 *Eared Cineras.* 3 *Cornucopia Pollicipes.* 4 *Common Scalpellum.* 5 *Smooth Anatifa.* 6 *Crenated Pyrgoma.* 7 *Warted Creusia.* 8 *Montagus Acasta.* 9 *Operculum of Do.* 10 *White Balanus.* 11 *Operculum of Do.* 12 *Crown Coronula.* 13 *Whale Tubicinella.* 14 *Vermicular Serpula.* 15 *Nautilus-shaped Spirorbis.* 16 *Recumbent Galeolaria.* 17 *Antiquated Magilus.* 18 *Triangular Vermilia.* 19 *Fan Amphitrite.* 20 *Belgic Pectinaria.* 21 *Shelly Terebella.* 22 *Thickest Sabellaria.* 23 *Large Cornuoides.* 24 *Snake-like Siliquaria.* 25 *Trochi-formed Brochus.* 26 *Tooth Dentalium.* 27 *Elephantine.* 28 *English Adna.*

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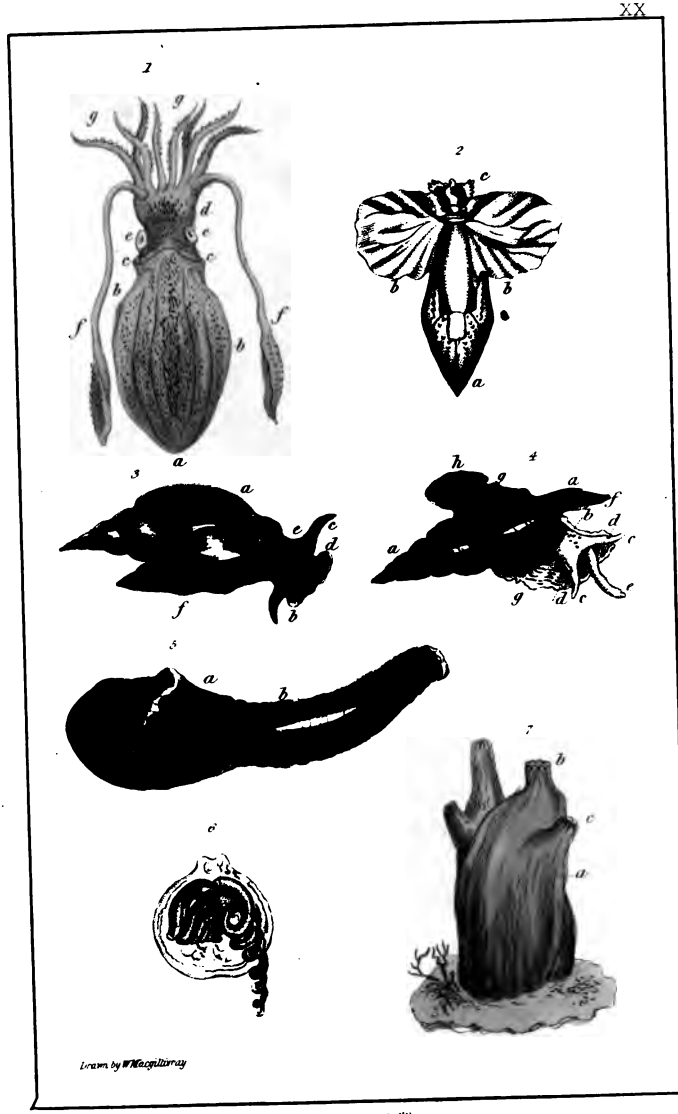

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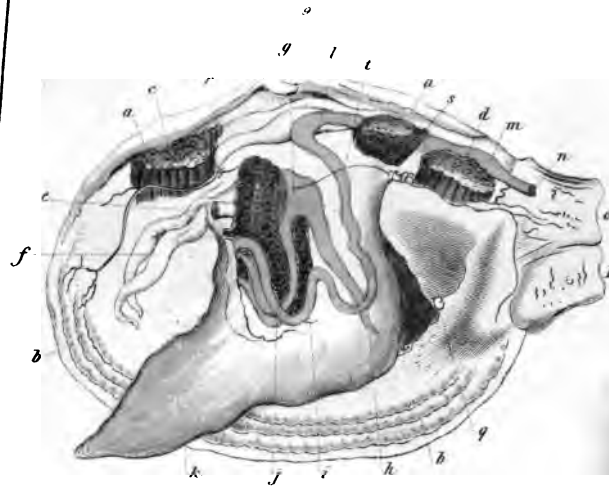

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THE

CONCHOLOGIST'S TEXT-BOOK.

INTRODUCTION.

CONCHOLOGY, TESTACEOLOGY, or MALACOLOGY, is that department of Natural History which treats of animals with a testaceous covering or shell.

The richness and variety of colours, the fine polish, the beauty and elegance of form, exhibited by shells, have always excited admiration, and procured for them a conspicuous place in the cabinet of the curious collector. But whatever interest the pursuit of this branch of knowledge may have excited, in this point of view, and however highly rare and beautiful shells have been prized, this is the least important feature of their history. Other and more rational considerations render the study of Conchology an agreeable pursuit. The animals of many kinds of testaceous shells furnish an excellent and nutritious food. Some tribes supply the table with a delicate luxury. Other shells, as those of mother-of-pearl, afford materials for ingenuity and art, in preparing it for various purposes: and the pearl itself, often the rival of the most precious gems in the estimation of mankind, is the production of several species of testaceous animals. Its nature and mode of formation, therefore, cannot fail to be objects of curious investigation. Even the pernicious effects of some species of this tribe of animals, demand the attention of man, in studying their nature, tracing their history, and in providing a remedy against their poisonous properties. The Snail ravages the garden and

the field, and marks its progress by the destruction of some of the fairest forms and most useful products of the vegetable kingdom; and the Ship-worm, the dread of the mariner, appears an insignificant instrument in the hand of Providence, in humbling the glory and pride of man, in demolishing, by its unseen labours, the noblest efforts of his ingenuity and skill.

Conchology, or the study of shells, has been sometimes confounded with Crustaceology, or that of Crabs; but the slightest attention to the subject will at once discover the obvious difference which exists between these two classes. Nature has not only well-defined them by the composition of the shells, but also by a manifest difference in the construction of the animals which inhabit them. Shells, properly so called, are composed of carbonate of lime, combined with a small portion of gelatinous matter; while those of the Crustacea are composed of phosphate of lime, along with the animal matter. Shells are, in general, permanent coverings for their inhabitants; and the animal is of a soft and simple nature, without bones of any kind, and attached to its domicile by a certain adhesive property or power, possessed by some of the muscles. On the other hand, shells of crustaceous animals are cast, and renewed annually. These animals are of a fibrous texture, with articulated limbs, and covered, as it were, in a coat of mail. Besides, the shells of crustaceous animals are produced all at once; those of the Testacea, are evidently formed by the animal gradually adding to them either annually or at least periodically; as may be distinctly seen in the common muscle: and all shells, strictly so called, are composed of layers, which is not the case with the coverings of Crabs and their congeners. This may be easily proved by taking a shell and filing it slowly, when the different layers are very perceptible; or put a Muscle-shell into the fire, when it will shortly begin to crackle and divide into separate laminæ. We have numberless instances of shells, both sea and land, which having been accidentally broken, have been repaired by the animal: almost every collection affords specimens of such mended shells.

The terms Conchology and Testaceology, which are synonymous, refer to all animals which have a testaceous or shelly covering, whether they inhabit the sea, the land, or fresh-water.

Some chemical writers have divided shells into two classes. The first are usually of a compact texture, resembling porcelain, with an enamelled surface, and are in general beautifully variegated. Those composing this class are called *porcelaneous shells*, of which kind are those of the genera Conus, Cypræa, Voluta, &c., of the Linnæan arrangement.

The second class consists of shells generally covered with a strong epidermis or skin, below which lies the shell in layers, and composed entirely of the substance well-known by the name of mother-of-pearl. In this class are the fresh-water Muscles, (the Mytilus Cygneus and Anatinus of Linnæus,) the genus Haliotis or ear-shells, the genus Turbo, and several of the Trochus tribe, &c.

The porcelaneous shells contain a very small portion of soft animal matter, and those of the second class a very large proportion;* but otherwise there is no real distinction between them.

Shells, then, are only the habitations of soft animals called Vermes, or Worms, which constitute the third order of Linnæus's sixth class of animals. According to that author, the animals which inhabit them may be arranged into ten genera, as follows:

1. Limax; 2. Doris; 3. Spio; 4. Amphitrite; 5. Terebella; 6. Nereis; 7. Ascidia; 8. Tethys; 9. Triton; 10. Sepia.

1. Limax.—Body oblong, creeping, with a fleshy kind of shield above, and a longitudinal flat disk beneath; aperture placed on the right side, within the shield; feelers four, situate above the mouth, and an eye at the tip of the largest ones.

This genus is what is generally termed the slug, or snail.

2. Doris.—Body creeping, oblong, and flat beneath; mouth placed below, on the fore-part; vent behind, on the

* See Thomson's System of Chemistry, vol. v. p. 507.

back, and surrounded by a fringe; feelers, two or four, seated on the upper part of the body in front, and retractile within their proper receptacles.

3. Spio.—Body projecting from a tube, jointed and furnished with dorsal fibres; peduncles, or feet, rough with bristles and placed towards the back; feelers two, long, simple; eyes two, oblong.

4. Amphitrite.—Body projecting from a tube and annulate; peduncles, or feet, small, numerous; feelers two, approximate, feathered; no eyes.

5. Terebella.—Body oblong, creeping, naked, often enclosed in a tube, furnished with lateral fascicles or tufts, and branchiæ; mouth placed before, furnished with lips without teeth, and protruding a clavate proboscis; feelers numerous, ciliate, capillary, seated round the mouth.

6. Nereis.—Body long, creeping, with numerous lateral peduncles or feet, on each side; feelers simple, rarely wanting; eyes two or four, rarely none.

7. Ascidia.—Body fixed, roundish, and apparently issuing from a sheath; apertures two, generally placed near the upper end, one beneath the other.

8. Tethys.—Body detached, rather oblong, fleshy, without peduncles; mouth with a terminal cylindrical proboscis, under an expanded membrane or lip; apertures two, on the left side of the neck.

9. Triton.—Body oblong; mouth with an involute spiral proboscis; tentacula or arms, twelve, six on each side, divided nearly to the base, the hind-ones cheliferous.

10. Sepia.—Body fleshy, receiving the breast in a sheath, with a tubular aperture at its base; arms eight, beset with numerous warts or suckers, and in most species two pedunculated tentacula; head short; eyes large; mouth resembling a Parrot's beak.

It is exclusively upon the shape of the shell, and not upon the structure of the animal inhabitant, that the Linnæan arrangement of Conchology is founded.

In early periods, naturalists were in much doubt whether to found their Conchological arrangements on the animal,

or the shells; but at last it was determined that it should be on the latter; because few of the marine shells that were then found had the animal in them, prior to the time when dredging was resorted to. The greater part of shells in many collections at the present day, have been found upon the beach, divested of their animal: they having been cast ashore by the agitation of the sea in storms, and the inhabitant decayed before they were picked up.

Many shells are very different in their young and adult states, both in form and colour; the student ought, therefore, to make himself well acquainted with the generic characters, to enable him to discriminate the difference. But, indeed, this is often a difficult matter, even to those who have studied the science for many years.

In almost all the species of the genus Cypræa, there is considerable difficulty in distinguishing them from the Volutæ and Bullæ, in their young state; the denticulated lip being the last part of the shell which the animal forms. The Strombus genus wants the expanded lip in the young shell: from which circumstance it is frequently taken for a species of the genera Buccinum or Murex.

The Linnæan arrangement of shells consists of three orders, viz. *Multivalve*, *Bivalve*, and *Univalve*.

The first order, *Multivalve*, is made up of shells consisting of more shelly parts or pieces than two. Every part of a shell which is connected with a corresponding part by a cartilage, ligament, hinge, or tooth, is called a *valve* of such shell.

The second order, *Bivalve*, is made up of shells having two parts or valves, generally connected by a cartilage: for example, the Cockle and Muscle.

The third order, *Univalve*, is made up of shells complete in one piece: for example, the Periwinkle and the Whelk. This order is subdivided: first, into shells with a regular spire, and those without a spire.

The first order consists of three genera: Chiton, Lepas, and Pholas.

The second order contains fourteen genera: Mya, Solen,

Tellina, Cardium, Mactra, Donax, Venus, Spondylus, Chama, Arca, Ostrea, Anomia, Mytilus, Pinna.

In the third order there are nineteen genera: Argonauta, Nautilus, Conus, Cypræa, Bulla, Voluta, Buccinum, Strombus, Murex, Trochus, Turbo, Helix, Nerita, Haliotis, Patella, Dentalium, Serpula, Teredo, and Sabella.

It will now be proper, before proceeding to a description of the generic characters of the Linnæan system, to make the student acquainted with the terms used in Testaceology, as far as regards the different parts of shells.

EXPLANATION OF THE PARTS OF SHELLS.

MULTIVALVE SHELLS.

Valves of Chitons.—Chitons in general have eight transverse, broad, but very short valves, placed on the back of the animal, and inserted at their sides into a marginal tough ligament. Plate I. fig. 6, *a*, *a*, *a*.

Operculum consists of four small valves on the summit of the Lepas, which shut up the superior orifice; it is in a certain degree stationary, and different from the operculum of univalve shells, which will hereafter be described. Plate I. fig. 1, A. Fig. 2. represents a profile view of the operculum removed from its place, *A* the front valves, *B* the back valves. Fig 3. a front view of the operculum.

Base is that part of the shell by which it is fixed to rocks and other bodies. Plate I. fig. 1. and 5, B B B.—H is a piece of stone to which the base is fixed, and G a piece of wood to which the shells of the particular kind here represented are generally attached.

Ligament is the membraneous or tendinous substance by which the valves or parts of the shell are attached. Some multivalve shells are connected, by the parts of one valve locking into another. Plate I. fig. 6, *a*, *a*, *a*. The liga-

ments vary considerably in their texture, being scaly, prickly, smooth, or punctated.

Ridges are certain convexities in many of the Lepas tribe, sometimes longitudinal and sometimes transverse. Plate I. fig. 1, F F.

Peduncle.—A sort of stem by which the shells of the second division of Lepas are attached to wood, &c. It is composed of a membranaceous tube, filled with a liquid which perhaps affords nourishment to the animal. Plate I. fig. 5, C C. The peduncle is usually affixed to a piece of wood as represented at G, or to some other solid body.

Feelers are those ciliated arms, evolved from the upper or hind part of the Lepas anatifera, and other shells of the genus Lepas. While the animal is in the water it continually moves its feelers, evidently for the purpose of entangling minute marine insects, as food. Plate I. fig. 5, E E.

Accessory Valves are small plates which cover the apex at the hinge of the Pholades, or are situated below the hinge. Plate I. fig. 4, *A*.

Margin.—A fleshy or cartilaginous border in which the valves are encased in the genus Chiton. Plate I. fig. 6, *b*, *b*.

BIVALVE SHELLS.

Bivalve shells consist of two parts or valves, connected by a cartilage, and a hinge which is generally composed of teeth, those of the one valve locking into corresponding cavities in the other.

The valves of some bivalve shells are formed exactly alike, but those of others are very different; the one being smooth, the other rugose; one flat, and another convex; and often one is shorter than the other.

The shells of the genera Mya, Solen, Tellina, Venus, and others, have in general both valves alike, while those of the genera Spondylus, Ostrea, Anomia, and Pinna, have in general dissimilar valves. The first of these kinds are called *equivalve*, and the latter *inequivalve*.

Equilateral shells are those of which the sides are alike,

as in the shells of the genus Pecten, commonly termed Scallop shells in England, or those shells worn by pilgrims in former times:

"And fix'd the *Scallop* on his hat before."—PARNELL.

Plate II. fig. 2, and Plate VII. fig. 14. This is also exemplified in the Pectunculus. Plate XVI. fig. 8.

Inequilateral Valves are shells whose sides are unequal, and of different shapes, as in the Mactra, Donax, &c. Plate XVII. fig. 5.

Summit, or *Umbo*, is the most elevated point of that part of the shell in which the hinge is placed. Plate I. fig. 7. and 11, *a a*.

In naming this the summit, we do not follow the axiom of Linnæus, but because we consider it more properly the summit of the shell than the opposite extremity.

Base is the reverse of the above, or that part of the shell immediately opposite the summit. Plate I. fig. 9. and 10, *d d*.

Sides, the right and left parts of the valves. Plate I. fig. 9, *c*.

Anterior slope is that part of the shell in which the ligament is situated. In viewing the anterior slope in front, the beaks of the shell retire from view. Plate I. fig. 7, *i*.*

Posterior slope, that part of the shell opposite the anterior slope; in viewing it in front, the beaks point to the observer. Plate I. fig. 7, *k*.*

Disk the convex centre of a valve, or most prominent part of the valve, suppose it with its inside lying undermost. Plate I. fig 7 *o*.

Inside, the concave part of a valve. Plate IV. fig. 11, *n*.

Cicatrix, or *Tongue*, is the impression left on the inside of the valves, by the adhering muscles of the animal. It differs in most shells, according to the shape of the muscle, as semi-ovate, round, unate, elongated, &c. As a specific distinction, it is often of great use; being, with a very few

* But what is thus commonly named anterior, is in fact posterior, as is known by examining the animal, of which the mouth is placed toward *k*, and the siphons toward *i*.

exceptions, alike in shells of the same species. Some shells have only one cicatrix, as the Edible Oyster, and Muscle; others have two, and some few more; the Tellina Fausta, for example. Plate I. fig. 9. and 11, *e e e e.**

Lunule.—The lunated depressions, situated in the anterior and posterior slopes. In different species of Venus they are prominent, characteristic marks, often of much service in ascertaining a species. Plate I. fig. 7, *b b.*

Ligament perforation.—The circular aperture, or perforation, through which the ligament passes; by which the animal of the Anomia attaches itself to stones, and other marine extraneous bodies; it is in general situated in the flat valve, though there are a few exceptions to the contrary. Plate I. fig. 10, *m.*

Hinge is the point at which bivalve shells are united. It is formed by the teeth of one valve inserting themselves between those of the other, or by the teeth of one valve fitting into the cavities or sockets of the opposite one.

It is on the peculiar construction of the *hinge* that the generic character of bivalve shells is principally founded, together with the general contour of the shell. Plate II. fig. 1. and 3, *q q q.*

Teeth of the Hinge.—Upon the number and relative situation of the teeth, principally depend the generic distinctions; they are of various forms, and very differently placed; some are single and large, others numerous and small, orbicular, spatuliform, laminated, &c. Some hinges have no visible teeth, and are termed *inarticulate.*—When a primary tooth has a groove or hollow in its centre, it is called complicated. Plate IV. fig. 6, *e.* Those with few teeth are termed *articulate.* Plate IV. fig. 1. and 12, and those with many teeth *multiarticulate.* Plate IV. fig. 2, 3, 4, &c. Plate I. fig. 6. and 8, *g g g g.*

Primary Teeth are those teeth in general situated in the

* Two distinct things are confounded in this definition. The cicatrix, or sinus, is a mark left by the siphon-tube, as in Fig. 11, and the *e* to the right. Muscular impressions are the marks left by the adductor muscles, as in Fig. 9, *e, e.*

centre of the hinge, and for the most part broad, large, and distinct, often elevated, and usually inserted in a cavity in the opposite valve. They however differ very much in some shells, but may easily be distinguished. Plate IV. fig. 1, 3, and 7, *a a a a a*. These are also termed the *Cardinal* Teeth, or the *Central* Teeth.

Lateral Teeth, Plate IV. fig. 10, are teeth which diverge from the umbo, or are situated at a distance from it, and are in general long and flat, often double and divided by a groove or hollow. Plate IV. fig. 2, 4, 6, and 7, *b b b b*.

Double Teeth, or teeth formed of two laminæ. Plate IV. fig. 1, *c c*.

Incurved Teeth are those which are bent round, as in the single tooth of the Solen Siliqua. Plate IV. fig. 2.

Recurved Teeth are those which are bent backwards, as in the hinge of the Panopea. Plate XVIII. fig. 9; and Spondylus, Plate IV. fig. 8, *f f*.

Middle Teeth, Plate IV. fig. 4, *d d*. Another term for the Primary, Central, or Cardinal teeth.

Numerous Teeth are those small upright teeth, set in rows, of which the hinges of all the species of the genus Area are formed. Plate IV. fig. 10, *k k*.

Cavity of the Hinge.—The hollow depression in which the ligament of the Ostrea is situated, generally of a triangular form. Plate IV. fig. 11, *g*.

Ligament of the Hinge, or the *Cartilage*, is that elastic fibrous substance by which the valves are united, and the hinges kept in their proper places; always situated under the beaks of the Shell. Plate II. fig. 1, 3, and 4, *l l l*; Plate IV. fig. 3, *n*.

Beak is the extreme point of the summit of bivalves, which in many species turns spirally downwards, or to the one side, as in most species of Venus, &c. From this circumstance it is seldom the highest part of the shell. Plate II. fig. 5, *r r*.

Seam.—When the valves are closed, the line of separation between them is so called. Plate II. fig. 6, *t t*.

Umbo.—That part situated immediately under the *beak.* Plate I. fig. 9, *w;* and Plate II. fig. 4, *w.* It is properly the most prominent part of the shell, near the hinge, and of which the beak is the tip.

Ears.—The processes on each side of the beak, in most species of that division of Ostrea, called scallops; some have one ear very large, and the other small; and some are scarcely observable on one side. Plate II. fig. 2, *h h.*

Superior Ear.—Plate IV. fig. 11, *h.*

Inferior Ear.—Plate IV. fig. 11, *i.*

Margin.—The extreme edge of the whole shell, or the circumference of either valve, all round. Plate I. fig. 7, *p;* and Plate II. fig. 1, *p.*

Crenulated Margin.—When the margins are notched, or marked with alternate prominences and depressions, which often interlock in the opposite valves, as in Cockles. It is by no means uncommon in other shells, particularly those of the genus Donax. Plate IV. fig. 6, *m m.*

Striæ are fine thread-like lines, generally on the exterior surface of shells, and are sometimes both longitudinal and transverse. When the striæ of shells appear indistinct, as if worn out, they are termed *obsolete striæ.* In some instances the insides of shells are striated; for example, the Murex Tulipa. (Fasciolaria tulipa, Lamarck.) The character of the striæ is often of much use in distinguishing species. Plate II. fig. 2, *f.*

Right Valve is that valve which, when viewed with the inside uppermost, has the anterior slope pointing to the right hand. Plate I. fig. 11; and Plate IV. fig. 5. and 6, *b.**

Left Valve.—The opposite of the above; the anterior slope points to the left hand, when viewed from the inside. Plate IV. fig. 3, 6, 7, 9, &c.*

Length of the Shell is taken from the ligament, or the

* But the only sure way of knowing which is right or left is to examine the animal, and place the shell in its natural position, that is, with the hinge above, and the ventral margin, Plate I. fig. 7, P, beneath; in which case the ligament is behind the umbones, so that what is usually termed right is actually left.

beak, to the opposite margin. For example, the common muscle: it is longer than it is broad, and the solens are broader than long. Plate I. fig. 5, *u u*; and Plate II. fig. 4, *u u*.

Breadth is measured from the most extreme edge of the anterior and posterior slopes, being in a contrary direction from its length. Many shells are *broader than long*, such as most of the Myæ, Solenes, Tellinæ, &c.; and the genera Mytilus, Ostrea, Pinna, &c., are in general longer than broad. Plate I. fig. 5, *v v*. Plate II. fig. 4, *v v*.*

Byssus, or *beard*, is an appendage composed of filaments of a silky texture, by which some of the Bivalves fasten themselves to their beds, such as the Muscles, Pinnæ, &c. Plate II. fig. 6, *s*.

DESCRIPTION OF PLATE IV.

HINGES OF THE LINNÆAN GENERA OF BIVALVES.

Fig. 1.—Hinge of the *Mya pictorum*. (Unio pictorum, Lamarck.) *a*. Primary tooth, *c c* double teeth.

Fig. 2.—Hinge of the *Solen Siliqua*. *b*. Lateral teeth.

Fig. 3.—Hinge of the *Tellina Radula*. (Lucina radula, Lamarck.) *a a*. Primary teeth, *n*. cartilage.

Fig. 4.—Hinge of the *Cardium aculeatum*. *b*. Lateral tooth, *d d*. middle teeth, *l l*. spines.

Fig. 5.—Hinge of *Mactra hians*. (Lutraria hians, Lamarck.)

Fig. 6.—Inside of both valves of the *Donax Trunculus*. *A* is the right valve, and *B* is the left valve; *b*. lateral teeth, *e*. primary complicated tooth, or cleft in the middle, *m m*. crenulated margin.

* The true length of the shell, however, is in the direction of the length of the animal, or from the anterior to the posterior extremity of the shell, and its height, from the ventral margin to the umbones, is what is above called the length.

Fig. 7.—Hinge of *Venus Gallina.* (Ortygia gallina, Leach.) *a a.* Primary teeth, *b.* lateral tooth.

Fig. 8.—Hinge of *Spondylus gœderopus, f f.* incurved teeth.

Fig. 9.—Hinge of *Chama Cor.* (Isocardia Cor, Lamarck.)

Fig. 10.—Hinge of *Arca pilosa.* (Pectunculus pilosus, Lamarck.) *k k.* numerous small teeth; the distinguishing characteristic of the genus *Arca.*

Fig. 11.—Hinge of *Ostrea varia.* (Pecten varius, Lamarck.) *g.* cavity of the hinge, *h.* superior ear, *i.* inferior ear.

Fig. 12.—Hinge of *Anomia Ephippium.*

UNIVALVE SHELLS.

The shells composing this order are far more numerous than those of the two preceding, both in genera and species. It requires a considerable degree of attention to discriminate many of the *species,* as they often closely resemble each other; and they are divested of the strong and distinct character afforded by the teeth of bivalves; besides many of the species present several varieties.

In the examination of shells of this order, the general contour or outline of the whole shell is the first particular to be attended to, as this leads to those distinctions necessary in the definition of simple, spiral, or turbinated shells; or, more strictly according to the Linnæan method of discrimination, Univalves with a regular spire, and those without a regular spire. The genera of this order are formed principally from the shape of the aperture, taken in conjunction with the general shape of the shell; from the spire being lengthened or depressed, being with or without a canal; the length of the beak and its direction, together with the particular form of the outer lip. The colour of shells only serves as a specific distinction, and cannot in this respect, in all cases, be depended upon, although in others it is an unvarying test. The particular manner in which the spots are disposed, frequently characterizes species.

Apex.—The summit, tip, or highest part of the spire. Plate II. fig. 7, 8, 9, *A A A.*

Base is the opposite extremity from the apex or tip of the spire. In shells with a beak or rostrum, it implies the tip of such beak; Plate II. fig. 11, *B.* In shells without a beak it is understood to be the lower part, as before-mentioned, opposite the apex; Plate II. fig. 8 and 9, *B B.* In the Patella and some others, the base of the shell is that part on which it rests when it is laid on its mouth. In the Dentalium and Teredo it is the wider end.

Body of the shell is the first or lower whorl of the spire, in which the aperture is situated, and is in general longer than the remaining whorls. Plate II. fig. 10 and 12, *F F;* and Plate III. fig. 7 and 9, *F F.*

Front of the shell, is that side where the aperture is situated. Plate II. fig. 7, *l;* and Plate III. fig. 8, *l.*

Back is the opposite side to that in which the aperture is placed or turned directly from the observer. Plate III. fig. 5 and 10, *G G.*

The *venter*, or belly, is the most prominent part of the lower whorl or body, generally situated in the vicinity of the lip over the aperture; and formed by the convexity of the aperture. It is in general only made use of in describing shells, whose body is large in proportion to the size of the spire. Plate III. fig. 5 and 10, *H H.*

Sides.—The extreme edges of the shell, when viewed either in front or from the back. Plate II. fig. 11, *K K K K K K K K.* Right side is, when the shell is viewed in front, that side next the observer's left hand. Left side, the side with the aperture in it.*

Aperture, or mouth, is that part of the lower whorl or body, by which the animal protrudes itself. It affords the principal generic distinctions of Univalve shells, and differs very much in shape; some apertures being rounded, others semilunar, angular, &c. Plate II. fig. 9 and 11, *C C;* and

* But when the shell is placed in its natural position, with the mouth below, the right side is what is here called the left.

Plate III. fig. 1, 3, and 14, *C C C.* Some apertures have a canal at their base, as in Plate XII. fig. 5, 6, 7, and others are devoid of it, as in Plate XIII. fig. 1, 2, 3. In various genera it extends the whole length of the shell, as in the Cypræa, and some of the Cones with depressed spires. It is either entirely open, or it is closed by an operculum or lid, which is usually affixed to the foot of the animal.

Canal, or gutter, is the inside of the elongation of the aperture, or both lips of the shell of those species with a beak, in which it forms a concave channel or gutter, running from its commencement in the aperture, to the extremity or base, Plate II. fig. 10 and 11, *Q Q;* Plate III. fig. 8, *Q.* Some species are furnished with two canals, one situated at the junction of the outer lip and body, as in the Murex Lampas, &c.

Beak, or rostrum, is that lengthened process in which the canal is situate; it commences a little higher up, on the outside, than the insertion of the canal in the inside, which is always distinctly marked by the line of the aperture. Plate II. fig. 11, *p.* This process is not so conspicuous in some of the species of Voluta, but is more marked in the genera Murex, Fusus, Pyrula, &c.

Pillar, or columella, is that part which runs through the centre of the shell in the inside, from the base to the apex in most univalve shells, and appears to be the support of the spire; or it may be defined the axis of the shell, round which the whorls are continued from the apex to the base. It is in general grooved or folded; but, as it is situated in the interior of the shell, a minute description is unnecessary. Plate II. fig. 10 and 12, *M M M M M;* and Plate III. fig. 9, *M M M.* The internal edge of its base is frequently described as having plaits, &c.

Plaited Columella, having upon it those folds, or plaits, which are the distinguishing characteristic of the Volutæ and other genera. Plate II. fig. 7, *z.*

Pillar Lip is a continuation of the glossy process with which the aperture is lined, and expanded on the columella.

Plate III. fig. 7 and 8, *O O.* This is termed the *Inner Lip* by some authors.

Outer Lip.—The expansion, or continuation of the body of the shell, on the left margin of the aperture, also lined with the glossy process of the aperture. Plate II. fig. 7, *N;* and Plate III. fig. 8, *N N N.* The latter is an example of the alated or winged shells.

Operculum, or lid. This is only an appendage to the turbinated or spiral shells affixed to the foot of the animal, sometimes of a testaceous, in other cases of a horny or cartilaginous substance. It acts as a door or lid, and is calculated for the protection of the animal, when it retires within its dwelling from the intrusion of its enemies, it being adapted to the shape of the aperture, which it closes nicely up. As exemplified in the horny operculum of the common Periwinkle, (the Turbo littoreus of Linnæus,) it is of a brown horny appearance; it is also to be found in the large Whelk, which is common in our seas, and sold in fish-markets as food. Plate III. fig. 4.

Spire consists of all the whorls of the shell, except the lower one, which, as before observed, is termed the body of the shell. Plate II. fig. 12, *D;* and Plate III. fig. 7 and 8, *D D.*

This spire is a prominent feature of the Univalve; and upon its being lengthened or elevated, shortened or depressed, &c. depends much of the generic and specific definition. Adanson, in his 'Natural History of Senegal,' printed at Paris in 1757, says that the external character of the spire varies according to the plane it turns upon, which, he observes, may be horizontal, cylindrical, conic, or ovoid. At the same time, he admits that there are a great many intermediate forms, which cannot properly be defined.

It is a remarkable circumstance, that many of the young shells have not the same number of turns or wreaths as the adults; from which it would appear, that the part of the animal nearest the apex, never increases in size. The number of wreaths cannot at all times be depended upon. A full-grown shell may, however, be known from the outer-

lip, which has generally an unfinished appearance in young shells. Indeed, in all the land and fresh-water shells, it is a distinct criterion, as they are never complete in the form of the outer-lip, till full grown.

Whorl is one of the turns, wreaths, or volutions of the shell. Plate II. fig. 8, *L;* and Plate III. fig. 10, *L.*

Depressed Spire is when the spire is very flat, as in the shells of the genus Planorbis, &c. Plate II. fig. 12, *d;* and Plate III. fig. 5, *s.*

A flat shell is figured in Plate III. fig. 14.

Involuted Spire, in those shells which have their whorls, or wreaths, concealed in the inside of the first whorl or body, as in some of the Nautili and Cyprææ. Plate III. fig. 3, *t;* Plate VII. fig. 19; and Plate VIII. fig. 21.

Suture of the Spire, is a fine spiral line, which separates the wreaths or whorls from each other; it is sometimes crenulated, undulated, or sulcated, and not unfrequently elevated or projecting. Plate II. fig. 9, *e e.*

Reversed, or *Heterostrophe Spire,* is when the volutions of the spire revolve in the same manner as a common cork-screw, or when the aperture is placed downwards, the suture of the spire runs upwards from the right hand to the left; as in Plate III. fig. 13. Such shells are also called *Sinistrose,* or turned to the left.

In some of the more depressed species of Helix, or Nautilus, great attention is requisite in order to ascertain which is really the upper side of the shell, for it is on that side the spiral turns are to be taken from the centre or apex; and, in most instances, this is to be determined by the oblique direction of the aperture to the under part, where the lip rarely extends so far as on the upper part. In fixed shells, such as Serpulæ, there is no difficulty, as the side which is sessile must be considered as the base, or under part. Thus, in the Serpula lucida the fixed part is sometimes very small, and the mouth protends spirally upwards, in a contrary direction to the sun; and therefore it must be considered a reversed or heterostrophe shell, the same as if the volutions nearest the mouth had turned laterally upon

the centre or fixed ones. This shell, indeed, is most frequently found with regular lateral volutions; and though subject to great variety, with respect to contortions, it invariably turns the aperture one way.

In some species of Nautilus, however, there can be no rule to ascertain whether the shells are dextral or sinistral; for when the aperture is exactly central, the lip embraces the body equally and the sides of the shell are similar as in the Nautilus Calcar which cannot be thus defined In others of that genus, as in N. Beccarii and N. Beccarii perversus, two shells, the principal distinction of which is the contrary turn of their volutions, it is easily determined by the convexity of the upper side, and, of course, the aperture being placed somewhat beneath.

Chambers are the cavities divided by partitions, at regular or irregular intervals; as in the Nautilus. Plate III. fig. 11, *w w w w w*.

In some of the Serpulæ there are also divisions, but they are not regular as in the Nautili and besides, they diffe from them in being devoid of a siphunculus or communication between the chambers; the animal forms a complete partition and adds to its shell, which it would appear to be obliged to do, from its body growing too large for its abode.

Several of th Patellæ have chambers formed of laminar partitions, subspiral cells, or processes these in general lie horizontally, and are quite open at one end, as in the Patella testudinaria, &c. of Linnæus, and the prickly Crepidula, and Chinese Calyptræa, Plate XIV. fig. 16 and 19; and Plate III. fig. 6, *w*, or funnel shaped, as in the Sipho striatus. Plate XIV. fig. 21.

Umbilicus is in general a circular perforation in the base of the lower whorl, or body of many univalve shells, and extending internally in h direction of the axis. This is common to most of the Trochi, in some species of which it penetrates from the base to the apex widest at the base, and gradually tapering to the top. Plate III. fig. 1, *u*.

Sub-umbilicated shells are those which have the umbilicus covered in a greater or less degree by a thin process; which,

in some, almost entirely closes the opening or mouth. This character is most commonly to be met with among species of Buccinum and Murex.

Shells which have no umbilicus are termed *imperforate.*

Siphunculus is that small round perforation which forms a communication between the chambers of the Nautili, and penetrates through the whole spire of the shell. Plate III. fig. 11, *v.*

Varices are transverse ribs which cross the whorls of shells in some species of Buccinum, Murex, and Tritonia; as exemplified in the Cassis Areola. Plate XI. fig. 21. Varices are formed by the periodical growth of the shells, they being the thickened margin of the outer lip, to which the animal has attached its periodical enlargements. In some species they have more the form of sutures than ribs; this is owing to the margin of the outer lip being but slightly developed.

Ribs are those longitudinal or transverse protuberances which are seen in many of the univalve shells. Plate III. fig. 12, *r r r r.*

Teeth of univalves, according to Colonel Montagu, are not properly denticles, or tooth-shaped protuberances, but are fine white laminæ, or ridges, running spirally backwards, in a parallel direction to each other; those on the exterior lip may, in most instances, be traced through the outside of the shell, and are nearly alike in length. Plate III. fig. 13, *a.*

Epidermis is a kind of cuticle, or membrane, covering the exterior surface of many shells of all the orders, destined by nature to protect their surface from being injured. This substance is the production of the animal inhabiting the shell; it is always present in certain species, and not at all in others. Shells with a rugged or uneven surface have almost always this epidermis. In some it is strong, laminated, velvety, fibrous or rough, often beset with long hairs, and in others very thin, smooth, and pellucid, and admits the colours of the shell to shine through it. In some species it is so dusky, that it entirely obscures the beautiful colouring of the shell beneath. Although many shells are very

Lepas Tintinnabulum. — THE LITTLE BELL LEPAS. Plate V. fig. 2. (Balanus Tintinnabulum, Lamarck.) Shell conical, with the valves strongly and irregularly ribbed, interstices delicately striated transversely; colour purple. Inhabits the West Indies.

Those described above are termed Acorn Shells in Britain. This genus consists of two families or divisions, very different in their shape. The first of these is composed of the Balani, or Acorn shells, of a subconic form, with an operculum or lid, consisting of either four or six valves; the body of the shell with six valves. The second family is that of the Anatiferous, or Barnacles, which are connected with, and supported at the base by, a tendinous tube or pedicle, of a flexible nature, allowing the animal to writhe about in quest of food; it has no operculum, is wedge-shaped, and consists of five or more unequal valves.

Lepas anatifera.--THE COMMON SMOOTH LEPAS. Plate I. fig. 2. (Anatifa lævis, Lamarck.) Shell compressed with five obsoletely striated valves; the lower valves somewhat triangular; the superior ones long, and tapering to an obtuse point; connected by an orange-coloured cartilage; base affixed to a peduncle of a colour between vermilion and orange.

This shell generally adheres to pieces of rotten wood or the bottoms of vessels, and is found in almost all seas.

Linnæus founded the name of this shell on the circumstance that it was from it that the Barnacle Goose was supposed to have had its origin. Gerard's account of this transformation, as it affords a remarkable instance of the credulity of the times, is too curious to be omitted. "There are found in the north parts of Scotland, and the islands adjacent called Orchades, certain trees whereon do grow certain shells tending to russet, wherein are contained little living creatures, which shells in time of maturitie do open, and out of them grow those little living things, which falling into the water do become fowles, which we call Barnacles; in the north of England Brant Geese; and in Lancashire, Tree Geese; but the others that do fall upon the land perish and come to nothing. Thus much from the writings of others, and also from the mouths of people of those parts, which may very well accord with truth.

"But what our eyes have seene and hands have touched we shall declare. There is a small island in Lancashire called the Hill of Flounders, wherein are found in the broken pieces of old ships, some whereof have been cast thither by shipracke, and also the trunks and bodies with the branches of old and rotten trees, cast up there likewise: whereon is found a certain spume or froth that in time breedith into certain shells, in shape like those of the Muskle, but sharper

pointed, and of a whitish colour, wherein is contained a thing in form like a lace of silk, finely woven as it were, together, of a whitish colour, one end whereof is fastened into the inside of the shell, even as the fish of Oysters and Muskles are; the other end is made fast unto the belly of a rude mass or lumpe, which in time commeth to the shape and form of a bird; when it is perfectly formed the shell gapeth open, and the first thing that appeareth is the foresaid lace or string; next comes the legs of the bird hanging out, and as it groweth greater it openeth the shell by degrees, till at length it is all come forth, and hangeth only by the bill; in short space often it cometh to full maturitie, and falleth into the sea, where it gathereth feathers, and groweth to a fowl bigger than a Millard, and lesser than a Goose, having black legs, bill or beake, and feathers black and white, spotted in such a manner as is our Magpie, called in some places a Pie-annet, which the people of Lancashire call by no other name than a Tree Goose; which place aforesaid, and those parts adjoining, do so much abound therewith, that one of the best is bought for three pence. For the truth hereof, if any doubt, let them repaire unto me, and I shall satisfy them by the testimonie of good witnesses."—*Gerard's Herbal*, p. 1558.

The shells of this genus adhere in clusters to rocks, shells, floating wood, and other extraneous marine substances, and being incapable of changing place, are supposed to be true hermaphrodites.

Genus 3.—PHOLAS.

Animal an Ascidia; shell bivalve, divaricate, with several lesser, differently shaped, accessary pieces, at the hinge; hinge recurved, united by a cartilage; in the inside, beneath the hinge, is an incurved projecting tooth.

Pholas crispata.—THE CURLED PHOLAS. Plate V. fig. 3. Shell oval, gibbous, pale ochreous-yellow; part next the hinge obtuse, gaping at both ends; a longitudinal furrow near the centre of each valve; one half covered with muricated waved striæ and wrinkles, the other substriated. 2 inches long, and 3 broad. Inhabits the British coasts.

Pholades are found below high water-mark, burrowed in hard clay, limestone, and wood, which they perforate in their younger state, and as they increase in size enlarge their habitation.

The phosphorescent property of the Pholades is very remarkable. They contain a liquor which shines with uncommon splendour in the dark, and illuminates whatever it touches, or happens to fall upon.*

"There is," says Dr. Priestley, "a remarkable shell-fish called Pholes, which forms for itself holes in different kinds of stone. This fish illu-

* See Memoirs of the French Academy, 1712.

minates the mouth of the person who eats it; and it is remarked, that contrary to the nature of other fish, which give light when they tend to putrescence, this is more luminous the fresher it is; and when dried, its light will revive on being moistened either with salt water or fresh; brandy however immediately extinguishes it."*

It is to be regretted, that the experiments made by chemists on those animals, which have a luminous appearance in the dark, have not been sufficiently decisive, to enable us to state the true cause of it; but there is every reason to believe that it proceeds from phosphorus, which is abundant in all animal bodies.

ORDER SECOND

BIVALVE SHELLS.

Genus 4.—MYA.

Animal an Ascidia; shell bivalve, generally gaping at one end; hinge, in most of the species, with a broad, thick, strong, patulous tooth, not inserted in the opposite valve.

Mya arenaria.—THE SAND MYA. Plate V. fig. 4. Transversely ovate, rounded behind; tooth very broad, thick, obtuse, projecting, and erect; with a small lateral tooth.

The Myæ are to be found both in the sea and in rivers. The marine kinds generally live under sand or sludge, and the place where they lie is betrayed by a small hole, out of which they occasionally protrude their siphon, which is placed at the posterior or upper end. Those which inhabit rivers, are generally found in the mud at its bottom. In some places the animals are used for food; but what makes them of considerable importance is, the quantity of pearls which they sometimes produce. As illustrative of the value of pearls produced by the Mya margaritifera, (Unio margaritifera, Lamarck,) it may be mentioned that according to Camden, Sir John Hawkins had a patent for fishing that shell in the river Irt in Cumberland. This shell is well known in Britain, by the name of the Pearl Muscle. We are informed in the Philosophical Transactions, that several pearls of great size have been procured from the rivers in the counties of Tyrone and Donegal in Ireland. One of them weighed 36 carats, and would have been worth £40, but owing to its being impure, it lost much of its value. Other pearls from the same places have sold from £4 10s., to £10 each.

* Priestley's Optics, page 567.

One of the latter price was sold a second time to Lady Glenlealy, who had it placed in a necklace, and refused £80 for it, which she was offered by the Countess of Ormond. There was also a great fishery for pearls in the river Tay, which extended from Perth to Loch Tay; and it is said that the pearls sent from thence, from the year 1761 to 1764, were worth £10,000. It is not uncommon in the present day, to find pearls in those shells, which bring from £1 to £2. It is said that those in the Scottish Crown which forms part of the regalia now exhibited in the Castle of Edinburgh, are the produce of the river Tay.

Genus 5.—SOLEN.

Animal an Ascidia; shell bivalve, oblong, open at both ends; hinge with a subulate reflected tooth, often double, and not inserted in the opposite valve.

Solen Siliqua.—THE POD SOLEN. Plate I. fig. 6. Shell linear, straight; in one valve two teeth, and one in the other, having a lateral inclined tooth corresponding with the opposite lamina; the exterior covered by a fine olivaceous brown epidermis, very glossy, and transversely striated, the striæ taking a longitudinal direction across the shell. One inch long, and from seven to eight broad. Common on most sandy shores of Europe.

u u Length of the shell, *v v* breadth of the shell.

Solen Ensis.—THE SABRE SOLEN. Plate V. fig. 5. Linear, a little bent like a sabre; with a single tooth and lateral lamina, in one valve, locking into two teeth, and double laminæ in the other; covered with a fine olivaceous, glossy epidermis; one inch long, and from five to seven broad. Inhabits the coasts of Europe.

Solen antiquatus.—THE ANTIQUATED SOLEN. Plate II. fig. 1. Shell thin, white, and subpellucid; moderately glossy, with concentric striæ; ends rounded and gaping: hinge near the centre, furnished with a single tooth in one valve locking in between two in the opposite; the teeth are erect, oblique, and stand beyond the margin; outside covered with an umber-coloured epidermis. Found on the Cornwall and Dorsetshire coasts.

l The cartilage, *n* inside, *p* margin or limb, *q* hinge.

The Solens inhabit the ocean; they are generally found buried about

six inches deep in the sand, into which they penetrate with great facility; their residence is known by a small dimple on the surface. In some places they are used as food.

Genus 6.—TELLINA.

Animal a Tethys; shell bivalve, generally bent at one end; in the fore-part of one valve a convex, of the other a concave fold; hinge with usually three teeth, the lateral ones smooth in one side.

There are three families of the Tellinæ: ovate and thickish,* ovate and compressed,** suborbicular.***

Tellina Fabula.—THE OBLIQUELY-STRIATED TELLINA. Shell very thin, pellucid, and oval, generally white or yellowish, and darker towards the umbo; which is nearly central, pointed, and turned a little to one side; the anterior side slopes to an obtuse point; the posterior side is large and rounded; hinge furnished with three teeth in one valve and two in the other; one valve obliquely striated.

Tellina Donacina.—THE DONAX-LIKE TELLINA. Plate V. fig. 6. Suboval, flattish, much sloping on the anterior side, semi-striated, and semi-pellucid; hinge with two teeth in one valve, and one in the other; pale yellow, longitudinally radiated with pink; half-an-inch long and three-fourths of an inch broad. Inhabits the coasts of Britain.

The Tellinæ inhabit the ocean, rivers, and lakes. Those of the ocean lie buried in the sludge, near the shore, and make two apertures in the sand; when the tide has receded, they may be easily found by looking for these marks.

Genus 7.—CARDIUM.

Animal a Tethys: shell bivalve, nearly equilateral, equivalve, generally convex, longitudinally ribbed, striate or grooved, the margin dentated; hinge with two alternate teeth in the middle, near the beak; one of them commonly incurved; and larger remote lateral teeth on one side, each locking into hollows in the opposite valve.

Cardium edule.—THE EDIBLE CARDIUM. Plate V. fig. 7. With about twenty-six antiquated longitudinal ribs; of

a cream yellow colour; the posterior end a little elongated. Usual diameter one inch; but they are found in Orkney two and a half inches in breadth, and two and a fourth in length; in which case the posterior extremity is considerably produced. When young the cockle is nearly orbicular, and pure white.

The cockles, with few exceptions, inhabit the ocean only; they, in general, burrow just under the surface of the sand, being but barely covered, owing to the shortness of their tube, by which they draw in and throw out the water. They are used as a wholesome and nourishing food; and abound on most sandy shores.

Genus 8.—MACTRA.

Animal a Tethys; shell bivalve, with unequal sides, equivalve; middle tooth of the hinge complicated, with a small hollow on each side, lateral teeth remote, and inserted into each other.

Mactra Lutraria.—THE MUD MACTRA. (Lutraria elliptica, Lamarck) Plate VI. fig. 8. Transverse oblong-oval, smooth, with irregular concentric striæ, and an olive, or yellowish epidermis, glossy white within; gaping at both ends. Two and a half inches long, and from four to six broad. Inhabits the British coasts.

Shells of this genus are never found in fresh water, but lurk in the sand or sludge, most commonly in the estuaries of rivers, or near them.

Genus 9.—DONAX.

Animal a Tethys; shell bivalve, with generally a crenulate margin, the frontal margin very obtuse; hinge with two teeth, and a single marginal one placed a little behind, rarely double, triple, or none.

Donax Trunculus.—THE TRUNCATED DONAX. Plate IV. fig. 6, and Plate VI. fig. 9. Transverse, oblong, glossy, finely striated longitudinally, and transversely banded and radiated with purple; white, clouded with purple within; internal margin crenulated. Inhabits the British coasts.

The shells of this genus are transverse, triangular, inequilateral, flattened, truncated before, and wedge-shaped. They inhabit the ocean;

lurking in the sand of the shore, where they may be found on the reflux of the tide; but also in rather deep water.

Genus 10.—VENUS.

Animal a Tethys; shell bivalve, the frontal margin flattened, with incumbent lips; hinge with three teeth, all of them approximate, the lateral ones divergent from the tip.

This genus is divided into two sections: pubentes* and impubentes.** This latter section is subdivided into three families: subcordate,† orbicular,†† and oval.†††

Venus Chione.—THE CHIONE VENUS. Plate I. fig. 4. (Cytherea Chione, Lamarck.) Shell strong, sub-cordated, somewhat concentrically wrinkled, margin entire, covered with a smooth, glossy, chestnut-coloured epidermis; sometimes a little radiated; beneath which the shell is of a beautiful pale purple; apex turned sideways, with a cordiform depression; umbo placed nearest one end. Inhabits the sea at Falmouth in Cornwall.

a a Summit, *b b* lunule, *i* anterior slope, *k* posterior slope, *o* disk, *p* margin or limb.

Venus compressa.—THE COMPRESSED VENUS. Plate I. fig. 9. (Crassina compressa, Leach.) Shell strong, thick, suborbicular, compressed, and slightly sulcated or irregularly wrinkled; colour white, but is usually covered by a thick yellowish-brown epidermis; umbo prominent, turning to one side, beneath which is a small cordiform depression; hinge with two teeth in one valve, and a transverse one. Inhabits the British seas.

c Sides, *d* base, *e e* cicatrix, *g g* teeth of the hinge, *w* the umbo.

Venus decussata.—THE DECUSSATED VENUS. Plate I. fig. 11. Shell ovate, with decussate striæ, angular before; apex turned to one side; umbo placed nearest one end; hinge furnished with three teeth in one valve; posterior slope very minute and retuse; anterior slope long and narrow, with generally an inner blue margin. The outside is commonly of a plain rusty brown, and marked with purple zigzag lines. Two inches long and three broad. Inhabits the British seas.

a Summit, *e e* cicatrix, *g g g* teeth of the hinge, *n* the inside.

Venus aurea.—THE GOLDEN VENUS. Plate VI. fig. 10. Suborbicular, inequilateral, transversely striated, and striated concentrically; of a fine golden-yellow. One inch long, one and a half broad. Inhabits the British seas.

The shells of this genus inhabit the ocean. They in general lurk in the sand; and many of the larger species are only to be found in very deep water.

Genus 11.—SPONDYLUS.

Animal a Tethys: shell hard, solid, and ridged, with unequal valves; one valve in general convex, and the other rather flat: hinge with two recurved teeth, separated by a small hollow.

Spondylus Gœderopus.—THE GÆDEROPUS SPONDYLUS. Plate VI. fig. 11. Upper valve red, under one white with longitudinal striæ and ribs, rough granulations, and somewhat tongue-shaped, truncated spines, which are rather short. Three inches long. Inhabits the Mediterranean, and is considered excellent food by the Italians. It is sold in the markets at Nice, and other towns on the Mediterranean.

Some of the Spondyli have ears, and others are devoid of them; they are in general strong, rugose shells. This genus requires considerable attention, as some of the species are subject to such variety, that they are frequently mistaken for distinct shells.

The shells of this genus inhabit the ocean. They adhere to rocks in deep water, and require considerable force to tear them from their retreats.

Genus 12.—CHAMA.

Animal a Tethys; shell bivalve, rather coarse; hinge with a callous gibbosity, obliquely inserted into a slanting cavity; anterior slope closed.

Chama Cor.—THE HEART CHAMA. Plate II. fig. 5, and Plate VI. fig. 12. (Isorcardia Cor, Lamarck.) Shell subglobose, beaks recurved; anterior slope with a gaping fent,

slightly wrinkled transversely, covered with a terra-sienna-coloured epidermis; umbo large and prominent, much contorted or incurvated, turned to one side, and not touching when the valves are closed; hinge strong, teeth flattish; inside smooth, white, margin plain. This is a very scarce British shell; but has been found off the North Foreland, the Hebrides, and in the Irish Channel, of large size.

o Disk, *r r* beak. Plate II. fig. 5.

The shells of this genus inhabit the ocean; they live only in very deep water.

The Chama Gigas, (Tridacna Gigas, Lamarck,) Giant Chama, is the largest and heaviest shell yet discovered, an individual having been seen of the amazing weight of 532 pounds, and the animal inhabitant so large as to furnish one hundred and twenty-two men with a meal; it is said to be very palatable. This species inhabits the Indian Ocean.

Genus 13.—ARCA.

Animal a Tethys; shell bivalve, equivalve; hinge with numerous sharp teeth, alternately inserted between each other.

Arca Noæ.—Noah's Ark. Plate VI. fig. 12. Shell rhombic, reticulated, beaks near one end, incurved, very remote and separated by a deep groove; of a deep umber colour, or whitish, with brown bands; orifices brown; and margin crenated. Two inches broad. Inhabits the West Indian seas, the Mediterranean and also Britain, but there of a small size.

Linnæus divides this genus into two families: * with the margin entire; ** with margin crenulated; and has subdivided them as follows: † beaks recurved; and †† beaks inflected.

Some of the Arcæ are affixed by the foot of the animal to rocks; and others lurk in the sand or mud near the sea-shore, generally between high and low water-mark.

Genus 14.—OSTREA.

Animal a Tethys; shell bivalve, generally with unequal valves, and slightly eared; hinge without teeth, but furnished with an ovate hollow, and for the most part lateral transverse grooves.

The Ostreæ are divided into three families: * valves radiated and eared, as in scallops; ** rugged or rough, as in the oyster; *** hinge

with a perpendicular furrowed line, as in the species of the genus Perna. The first family is again subdivided into three sections: † valves equilateral, and ears equal; †† ears unequal, and having one of them generally ciliated with spires within; ††† valves gibbous on one side.

Ostrea lævis.—THE SMOOTH OSTREA. Plate II. fig. 2. (Pecten Lævis, Lamarck.) Shell thin, flat, suborbicular, and pellucid, longitudinally and transversely striated; one ear considerably larger than the other; colour various, sometimes orange, dark pink, &c. Not uncommon on the coast of Northumberland. The striæ on this shell are so minute, that they can seldom be seen with the naked eye.

F Longitudinal and transverse striæ, H H ears or auricles.

Ostrea opercularis.—THE LID OSTREA. Plate VII. fig. 14. Ears nearly equal; shell with about twenty rounded ribs finely striated longitudinally and transversely; beautifully variegated with red, orange, purple, or brown; upper valve somewhat convex. Inside pure white. Three inches long. Inhabits the British seas.

The Ostreæ inhabit the ocean; some lurk in the sand in large beds, others adhere to rocks, and some to the mangrove trees which overhang the sea on the shores of the West Indies.

The Edible Oysters of Britain are said to be superior to those of all other countries, and are common on many of our coasts. Indeed, this country has been noted for oysters from the time of Juvenal, who flourished in the beginning of the second century. In satirizing Montanus, an epicure, he says:

He, whether Circe's rock his oysters bore,
Or Lucrine lake, or distant Richborough's shore,
Knew at first taste.

The luxurious Romans were very fond of oysters, and had their layers or stews for them as we have at the present time. Sergius Orata was the first inventor, as early as the time of L. Crassus the orator. He did not make them for the sake of indulging his appetite, but through avarice, and enjoyed great profits from them. Orata got much credit for his Lucrine oysters, for, says Pliny, the British were not then known.

The oyster is a very entertaining object to those who are fond of microscopic investigation. In the clear liquor around the animal, many minute, round, living animalcules have been found, whose bodies being conjoined, form spherical figures with tails, not changing their place otherwise than by sinking to the bottom, being heavier than the fluid; these have been frequently seen separating, and coming together again

In other oysters, animalcules of the same kind were found not conjoined, but swimming by one another, where they seemed in a more perfect state, and were judged by Leeuwenhoek to be the animalcules in the roe or melt of the oyster.

A female oyster being opened, incredible numbers of small oysters were seen, covered with little shells, perfectly transparent, and swimming along slowly in the liquor; and in another female, the young ones were found of a brown colour, and without any appearance of life or motion.

In the month of August oysters are supposed to breed, because young ones are then found in them. Leeuwenhoek, on the 4th of August, opened an oyster, and took out of it a prodigious number of minute oysters, all alive, and swimming nimbly about in the liquor, by means of certain exceeding small organs extending a little way beyond their shells; and these he calls their beards. In these little oysters he could discover the joinings of the shells; and perceived that there were some dead ones, with their shells gaping. These, though so extremely minute, are seen to be as like the large oyster, as one egg is like another.

As to their size, he computes, that 120 of them in a row would extend an inch; and consequently, that a globular body, whose diameter is an inch, would, if they were also round, be equal to 1,728,000 of them. He reckons 3,000 or 4,000 are in one oyster, and found many of the embryo oysters among the brairds; some fastened thereto by slender filaments, and others lying loose; he likewise found animalcules in the liquor 500 times less than the embryo oysters.

Genus 15.—ANOMIA.

Animal an emarginate ciliate strap-shaped body, with bristles or fringes affixed to the upper valve; arms two, linear, longer than the body, connivent, projecting, alternate on the valve and ciliate on each side, the fringe affixed to each valve; shell bivalve, inequivalve, one of the valves flattish, the other gibbous at the base with a produced beak, generally curved over the hinge; one of the valves often perforated near the base; hinge with a linear prominent cicatrix, and a lateral tooth placed within, but in the flat valve on the very margin; two bony rays for the base of the animal. Plate VII. fig. 15.

Anomia undulata.—THE WAVED ANOMIA. Plate VII. fig. 15. Suborbicular, with fine irregular, undulated, longitudinal, smooth striæ, crossing transverse curved ones; in-

side pearly shining green. One and a half inch wide. Inhabits the British seas.

Anomia Ephippium.—THE SADDLE ANOMIA. Plate I. fig. 7. Shell suborbicular, irregularly wrinkled, and waved; upper valve convex, under flat and perforated at the hinge, through which the ligament passes by which it is affixed to other bodies; inside perlaceous, and of various changing colours; green, purple, violet, or yellow.

Often to be met with adhering to the common oyster, or Ostrea maxima.

a Base, *m* ligament perforation.

The Anomiæ inhabit the ocean. The animal attaches itself to fuci, shells, stones, and other extraneous bodies at the bottom of the sea: they are generally affixed by a testaceous plug, which adheres to one of the muscles of the animal and passes through the perforation in the flat valve.

Genus 16.—MYTILUS.

Animal allied to an Ascidia; shell bivalve, rough, generally affixed to other bodies by a byssus or beard of silky filaments; hinge mostly without teeth, having a subulate, excavated, longitudinal line. Plate VII. fig. 16.

The Linnæan Mytili are divided into three families: * parasitical, affixed as it were by claws, as exemplified in the Mytilus Crista Galli; ** flat or compressed into a flattened form, and slightly eared; as in the Mytilus margaritiferus; *** elongated, ventricose, or convex, as in Mytilus edulis.

Mytilus edulis.—THE EDIBLE MUSCLE. Plate II. fig. 4 and 6. Shell oblong, pointed at the beak, sides much sloped; anterior side a little angulated; smooth, and radiated with deep blue or purple; covered with an umber-coloured epidermis; inside, round the margin, of a fine blue, which grows gradually lighter towards the centre; cicatrix very distinct and glossy; beneath the beak are several crenulations, which some have supposed to be teeth.

This is the most common shell we have, and well known by the name of Muscle or Mussel. It forms a pleasant and nutritious food. They have, however, in some localities, proved poisonous, and fatal consequences have followed

eating them. The true nature of this poison has not yet been satisfactorily determined.

Plate II. fig. 4 and 6. *a* The cartilage, *v v* length of the shell, *u u* breadth of the shell, *o* disk, *r r* the beak.

Mytilus incurvatus.—THE INCURVATED MYTILUS. Plate VII. fig. 16. Oblong oval, nearly smooth, both valves much inflated, and curved on one side near the ligament, apex acute, and base much widened. Inhabits the British coasts. Probably it is only a variety of the Mytilus edulis.

It is to the Mytilus margaritiferus, (the Meleagrina margaritifera of Lamarck,) Plate XV. fig. 10, that we are indebted for that precious gem, the oriental pearl. It is an inhabitant of the Indian Ocean; where it is regularly fished for by men who dive to the bottom of the sea, in places where it frequents. In this perilous employment the divers are often attacked by sharks, and not unfrequently lose their lives.—Mother-of-pearl ornaments are made from the shell itself.

The Mytili inhabit the ocean, lakes, rivers, and ponds. Marine muscles adhere to rocks or beds by a thin but very tenacious byssus, consisting of extremely fine and tough filaments, and some to the Gorgoniæ by a kind of claws. Some penetrate calcareous and argillaceous rocks, where they reside without changing place, others adhere to rocks or clay on the shore. They are much used for bait or food, and as such they are esteemed by many. The fresh-water muscles are generally found on the surface, or a little way under the mud. Most species of muscles produce pearls.

Genus 17.—PINNA.

Animal a Limax; shell sub-bivalve, fragile, upright, gaping at one end, and furnished with a silky byssus or beard: hinge without teeth.

Pinna pectinata.—THE PECTINATED PINNA. Plate VII. fig. 17. Thin, pellucid, light horn coloured; longitudinally ribbed, and spinous for half its width, obliquely striated, transversely on the other half. Six and a half inches long and three broad. Inhabits the British seas.

The Pinnæ, which frequently grow to a large size, only inhabit the ocean. They are generally found standing erect in the smoother water bays, with the broad end or base of the shell uppermost. They are sometimes affixed by their byssus or beard, to rocks or other bodies, and so firmly attached, that they can by no means be disengaged but at the will of the animal.

In Italy, the byssus of the Pinna is woven into a sort of silk. The

fibres or filaments of which it is composed, are very tough, and of a fine glossy brown colour. The ancient Romans highly esteemed articles made of this byssus; and at Naples and Palermo there are still manufactories of it. Stockings, gloves, and even a fabric resembling sarsnet, are made from it; and also an imitation of broad cloths. This latter stuff is very expensive, a coat being about the value of ten pounds of English money.

The Pinna has obtained among the Italians a little reputation for the practice of some of the moral virtues, in treating a small species of crab with hospitality and friendship, by receiving it into the shell, and defending it against its enemies. In return for this kindness, the crab, like the jackal with the lion, acts the part of a provider and monitor, by warning its host of the presence of its prey, or the approach of an enemy. But this friendly intercourse, like the fabulous account of the lion and the jackal, accords ill with the nature of the animals between which it is practised. The crab, it is far more probable, is a troublesome intruder; and, notwithstanding all the service he can repay, is considered a very unwelcome guest, and is indebted for his lodging to his activity and instinctive sagacity in providing for his own personal safety, retaining possession from the sluggish nature of his host, rather than to his kindness and hospitality.

Genus 18.—ARGONAUTA.

Animal a Sepia or Clio; shell univalve, spiral, involute, membranaceous, and unilocular, or consisting of a single apartment or cell.

Argonauta Argus.—THE ARGUS ARGONAUTA. Plate VII. fig. 18. Involute, extremely fragile, white, ribbed, and obsoletely striated; the keels approximate and tuberculated, from six to eight inches in diameter. Inhabits the Mediterranean.

The Argonauta Argus, or Paper Nautilus, is the Nautilus so famous amongst the ancients, and frequently mentioned in the writings of Pliny and others.

The singular structure and wonderful economy of this animal very early attracted the attention of naturalists. To its progressive motion on the surface of the ocean mankind are indebted, it is said, for the first hint of using sails in navigation. This is alluded to by Pope, in the following lines:

> Learn of the little Nautilus to sail,
> Spread the thin oar, and catch the driving gale.

What the particular organization is which enables this animal to rise to the surface, or to sink to the bottom of the ocean at pleasure has not yet been satisfactorily accounted for by naturalists; whether

it is by throwing out a quantity of water, by which it becomes specifically lighter than the element in which it lives, or by taking in a quantity of air, which will produce the same effect. It is only when the sea is calm and unruffled, that the Argonauta, with his feeble bark, appears on the surface. In rising through the water, the shell is reversed, the sharp edge of the keel presenting less resistance to the liquid, and when it reaches the surface, the animal, by exserting its arms, restores it to a proper position for its voyage. A quantity of water is taken into the shell to balance it; the animal then employs its arms as oars; or if a gentle breeze sweep the surface, it erects an ovate extensible membrane, at the extremity of the tentacula, in the manner of a sail, while its arms serve as oars to direct its course, or to keep the shell steady, as well as part of the body which hangs over the shell and serves to act the part of a rudder. Thus equipped, the solitary navigator, in his little galley, impelled by the breeze, glides smoothly along the bosom of the ocean. But on the approach of the smallest danger, it instantly retires within its shell, and, taking in a quantity of water, or ejecting a volume of air, quick as thought it sinks to the bottom. In fine weather this shell is frequently to be met with in the Mediterranean and has obtained amongst seamen the name of "Portuguese man-of-war," under which name, however, are confounded two or more very distinct animals.

Genus 19.—NAUTILUS.

Animal unknown. Shell univalve, divided into several compartments, communicating with each other by a siphunculus or aperture.

The Linnæan Nautili are divided into two families: * spiral and rounded, ** elongated and straight. Of the former there are two sections: † whorls contiguous, †† whorls separated.

Nautilus Pompilius.—THE PEARLY NAUTILUS. Plate VII. fig. 19. With the aperture heart-shaped, the spire involute and concealed, pale yellow with mixed streaks and undulations of bright chestnut; aperture pearly and shining, within from five to eight inches in diameter. Inhabits the East Indian ocean. Plate III. fig. 3, represents this shell with the lip cut straight, and a piece removed from the side, to show the involuted spire. *c* aperture, *t* involuted spire.

Nautilus Spirula.—THE SPIRAL NAUTILUS. Plate III. fig. 11. (Spirula Peronii, Lamarck.) Aperture of the shell orbicular; whorls cylindrical, separated, and gradually decreasing inwards, the first a little straight; siphunculus

contiguous to the walls of the shell; outside of a pale cream colour, perlaceous within.

Inhabits the American and Indian oceans.

v Siphunculus, w w w w w chambers.

The curious structure of the shell of the Nautilus Pompilius, (which also runs, with some variation, through the whole genus,) cannot be contemplated without admiration, each cell or camera communicating with the next by a small and short tube, the first or principal cell being far larger than the rest, and appearing destined to contain the chief part or body of the inhabiting animal, the nature of which is not yet properly understood. It appears, however, to be in some degree allied to the genus Sepia, but is destitute of long arms or claspers, instead of which it is furnished with several rows of short, broad, subdivided or palmated tentacula, spreading in a radiated direction round the mouth or beak: it is also provided with a concave expansile hood or process, which it is supposed occasionally to extend by way of a sail.

The animal is figured in Shaw's Nat. Misc. Plates 579 and 580. But it has been more correctly described and figured by Professor Owen and other anatomists of the present day.

With a very few exceptions the Nautili have only been found to inhabit the ocean.

Genus 20.—CONUS.

Animal a Limax; shell univalve, convolute, turbinate; aperture effuse, longitudinal, linear, without teeth, entire at the base; pillar smooth.

This genus in the Linnæan System is divided into five families: *having the spire or turban nearly truncate or flat; **pyriform, with the base rotundate, and sub-cylindrical, the cylinder one half longer than the spire; ***elongate, with the base rotundate, cylinder twice the length of the spire; ****ventricose in the middle, and narrow at each end; *****ventricose, and emits a tinkling sound when thrown on its back upon a table.

Conus striatus.—THE STRIATED CONE. Plate VIII. fig. 20. Ovate, oblong, gibbous, clouded, and with strong transverse striæ. Four inches long. Inhabits Africa and India.

Conus varius. Plate II. fig. 12. Rubbed through to show the internal structure of the shell. D Spire, F body, M M M pillar or columella.

The Cones inhabit the ocean, and are generally found on rocky shores.

Many of the Cones are very beautiful. Some of them bring the highest prices of all shells, from their great rarity. One species, the Cedo Nulli of Lyonet, is valued at one hundred guineas. Cones are covered with an epidermis, and it is not till this is removed that their beauty can be seen. Their surface is highly polished, contributing much to heighten the delicate and glowing tints which are diffused over some of the finer species in an infinite variety of undulations, clouds, spots, and bands.

Genus 21.—CYPRÆA.

Animal a Slug; shell univalve, involute, sub-ovate, smooth, obtuse at each end; aperture effuse at both extremities, linear, extending the whole length of the shell, and dentated or toothed on each side.

Linnæus divides the genus Cypræa into four families: *mucronate, or pointed; **obtuse, and without any manifest spire; ***umbilicated, or with a small perforation; ****marginated.

The genus Cypræa consists of beautifully coloured, and very highly polished shells. It is said, that they leave their shells annually, and construct new and larger ones. But we have not been able to ascertain this point as a fact.

They live in sand at the bottom of the sea; the animals are provided with a membrane, which they throw over their shells, and which preserves the fine polish, and prevents other testaceous bodies from fixing on them. The Cyprææ have only been found to inhabit the ocean.

Cypræa Uropæa.—THE EUROPEAN CYPRÆA. Plate VIII. fig. 21. With numerous transverse furrows, tumid on the back, pale purple or whitish, and generally with three dark blackish-brown spots. Half an inch long. Inhabits the British seas.

Genus 22.—BULLA.

Animal a Limax; shell univalve, convolute, and unarmed with teeth; aperture a little straitened, oblong, longitudinal, very entire at the base; pillar oblique and smooth.

Bulla Catena.—THE CHAIN BULLA. Plate VIII. fig. 22. (Bullæa Catena, Lamarck.) Ovate, white, pellucid, with minute chain-like transverse striæ; aperture extremely large, obtuse at the top, with a single volution, and one-fourth of an inch long. Inhabits the British seas.

The shells composing the genus Bulla inhabit the ocean, lakes, rivers, and ditches. The marine species are found a few inches under the sand. Some of the species may be frequently taken alive in little pools, between high and low water-mark, in which they are often seen sporting, with a very rapid motion, in the sunbeams.

The animal inhabiting the Bulla is considerably too large for its shell, and cannot contract itself wholly within it, as most other animals which have a testaceous covering can do.

Genus 23.—VOLUTA.

Animal a Limax; shell single celled and spiral; aperture without a beak and somewhat effuse; pillar twisted or plaited, generally without lips or perforation.

Linnæus divides this very extensive genus of shells into five distinct families: *aperture or opening entire; **somewhat cylindrical and emarginate; ***obovate, effuse, and emarginate; ****fusiform; *****ventricose, spire papillary at the top.

Voluta episcopalis.—THE EPISCOPAL VOLUTA. Plate VIII. fig. 29. (Mitra episcopalis, Lamarck.) Emarginated, smooth, margin of the volutions entire; lip denticulated; columella with four plaits. Five inches long. Inhabits the Indian ocean. Variously spotted with orange.

Voluta Oliva.—THE OLIVE VOLUTA. Plate II. fig. 7. (Oliva, Lamarck.) Shell smooth and glossy; spire reflected at the base; pillar with four plaits; clouded, or covered with zigzag or waved lines of a pale brown colour. Found in the Indian seas, in endless varieties of colours and markings.

A Apex, I front, N outer lip, Z plaits of the pillar-lip or columella.

The Volutes have only been found in the ocean, and are most common in inter-tropical climates.

Genus 24.—BUCCINUM.

Animal a Limax; shell univalve, spiral, gibbous; aperture ovate, terminating in a short canal, leaning to the right, with a retuse beak or projection; pillar-lip expanded.

The Buccina are divided by Linnæus into nine families: *inflated, rounded, thin, sub-diaphanous, and brittle; **with a short, exserted, reflected beak, lip unarmed outwardly; ***lip aculeated on the outside of the posterior part; in other respects resembling the last divi-

sion; ****pillar-lip dilated and thickened; *****pillar-lip appearing as if worn flat; ******smooth, and not enumerated in the former divisions; *******angular, and not included in the former divisions; ********tapering, subulate, and smooth.

Buccinum Lapillus.—THE COMMON WHITE BUCCINUM. Plate VIII. fig. 24. (Purpura Lapillus, Lamarck.) Oval, pointed, spirally ridged, and faintly striated; columella broad, flattish, and impressed near the top; yellow, white, chestnut, orange or brown, sometimes with spiral bands; aperture oval, acute, lip thin, and slightly crenate. One inch long. Inhabits the European seas.

This is one of the shells from which the ancients are supposed to have extracted their indelible purple dye, called the Tyrian purple. The part containing the colouring matter, is a longitudinal vein, just under the skin on the back, behind the head, appearing whiter than the rest of the animal. If the vein is laid open with a needle, a tenacious yellow matter will flow, which being applied with a hair pencil to linen, silk, or paper, will in a short time become of a bright yellow, will soon change to pale green, then assume a bluish cast, and afterwards a deep and brilliant purple. These changes are more or less accelerated by the presence or absence of the solar rays: but even without the influence of the sun, it will go through all these changes in two or three hours. Neither air, light, nor washing can afterwards alter its hue.

The Buccina generally inhabit the ocean, or its shores.

Buccinum undatum.—THE WAVED BUCCINUM. Plate II. fig. 10. Shell with from seven to eight ventricose volutions, and undulated ribs; transversely striated, and crossed with fine longitudinal striæ; pillar-lip reflected, and glabrous. Inside white, or deep yellow in some. Four inches long.

A common shell on most of the British shores.

F Body, M M the pillar or columella, O canal or gutter.

Genus 25.—STROMBUS.

Animal a Limax; shell univalve and spiral; aperture much dilated; the lip expanding and produced into a groove leaning to the left.

Linnæus divides the Strombi into four families: *lip projecting into linear divisions or claws; **lobed; ***dilated; ****tapering, with a very long spire.

Strombus Pes-Pelecani.—PELICAN'S FOOT STROMBUS. Plate VIII. fig. 25. (Rostellaria Pes-Pelecani, Lamarck.) Volutions surrounded by a row of tubercles; lip expanded into four palmate angular claws; body with two rows of tubercles, gray or reddish-brown. Two inches long. Inhabits the British coasts.

The shells composing this genus inhabit the ocean, and are in general found on rocky shores.

Strombus pugilis.—THE FIGHTING STROMBUS. Plate III. fig. 8. Anterior lip prominent, rounded, smooth; spire spinous; beak three-lobed, obtuse, flesh-coloured, reddish or brownish, within paler and polished; back smooth; first whorl of the spire crowned with spines, which in the others grow gradually less; the outermost whorl cancellate; pillar-lip much reflected; three and a half inches long.

Inhabits South America, and the shores of the West India islands.

D Spire, I front, N N N the outer lip, O pillar-lip, Q canal or gutter.

The young shells of this genus want the dilated lip, which is one of the most essential characters of the Strombi, and are in consequence liable to be confounded with the genera Buccinum and Murex.

Genus 26.—MUREX.

Animal a Limax; shell univalve, spiral, rough, with membranous sutures; aperture oval, ending in an entire straight or slightly ascending canal.

Linnæus divides the Murices into six families: *spinous, with a produced beak; **sutures expanding into crisped foliations; beak abbreviated; ***ventricose, with thick protuberant rounded sutures; ****more or less spinous, and without manifest beak; *****with a long, straight, subulate, closed beak, and unarmed with spines; ******tapering, subulate, with a very short beak.

Murex antiquus.—THE ANTIQUATED MUREX. Plate VIII. fig. 26. (Fusus antiquus, Lamarck.) Oblong, transversely striated; beak rather elongated; spire with seven or eight convex volutions: yellowish white, aperture saffron-yellow, with margin of outer lip acute, and entire. From six to eight inches long. Inhabits the British coasts.

Murex muricatus.—The MURICATED MUREX. Plate II. fig. 11. Shell strong and rough, with from six to seven ventricose, tuberculated volutions, tapering to a fine point; the tubercles are formed by interrupted, longitudinal ribs, crossed by strong elevated striæ, and in some parts are pointed or angulated; apex smooth; aperture oval, terminating in a long slender canal; outer lip sharp and dentated at the edge, margin within crenulated; pillar-lip smooth. Inhabits the British seas, rather a local shell.

B Base, C aperture, K K, &c. sides, P the beak or rostrum, Q canal or gutter.

The Murices are only found in the ocean. They in general frequent rocky shores, and some of them burrow in the sand.

Genus 27.—TROCHUS.

Animal a Limax; shell univalve, spiral, more or less conic; aperture somewhat angular or rounded, the upper side transverse and contracted; pillar placed obliquely.

Linnæus divides the Trochi into three families: *umbilicated, erect, with pillar perforated; **imperforate, erect, with the umbilicus closed; ***tapering, with an inserted pillar, and falling on the side when placed upon the base.

Trochus papillosus.—THE PIMPLED TROCHUS. Plate VIII. fig. 27. Conic, imperforate at the base, spirally granulated, and not marginated at the edges of the volutions; body tumid, and spire tapering abruptly to an acute apex; flesh-coloured; one and a half inch long.

Trochus umbilicatus.—THE UMBILICATED TROCHUS. Plate III. fig. 1. Shell conico-convex, flattish, rounded at the top; apex depressed, volutions five, slightly emarginate, defined by a fine line; spirally striated, rather whitish, with zigzag lines of purple; aperture compressed and angulated; with a large umbilicus which extends to the apex. Found on the Northumberland and Yorkshire coasts.

C Aperture, U umbilicus.

The Trochi inhabit the ocean, with the exception of a few land species. They generally frequent pools, which are wet when the tide recedes; some few of them live in very deep water.

Genus 28.—TURBO.

Animal a Limax; shell univalve, spiral, and solid; aperture contracted, orbicular, entire.

The shells composing this genus are divided into five families: *with the pillar-margin of the aperture dilated and imperforate; **solid and imperforate; ***solid, perforated; ****cancellated; *****tapering.

Turbo rudis.—THE RUSTIC TURBO. Plate IX. fig. 28. Sub-oval, faintly striated transversely, with five tumid volutions; outer lip thick, glossy within; dull yellow, drab, or fawn coloured; volutions separated by a deep suture. Three-fourths of an inch long. Inhabits the British coasts.

Turbo Terebra.—THE AUGER TURBO. Plate III. fig. 9. (Turritella terebra, Lamarck.) Taper, pointed, with twelve or sixteen volutions, and numerous strong, spiral striæ, the intermediate spaces prominent and acute; white, reddish, or cream coloured; one and a half inch long. Inhabits the British seas.

This figure represents the shell sectioned, to show the internal structure of the columella, F body, M M M columella.

Turbo costatus.—THE RIBBED TURBO. Plate III. fig. 12. (Pyramis costatus, Brown.) Shell sub-pellucid, white, and subturreted; volutions five, with prominent, longitudinal ribs, a little oblique; apex obtuse; aperture suborbicular, with a thick sulcated margin.

Found on the coasts of Pembrokeshire, Dorsetshire, and Northumberland.

R R R R Ribs.

Turbo labiatus.—THE LIPPED TURBO. Plate III. fig. 13. (Clausilia labiata, Lamarck.) Shell with nine reversed volutions or whorls, tapering to a fine point; colour light brown, with strong, regular, longitudinal striæ; volutions flat, and separated by a fine obsolete line; aperture suborbicular and white, with a sinus at the upper end, and two teeth-like laminæ on the inner lip; margin reflected, broad and thick. Found in Hyde Park, and the osier grounds at Battersea in Surrey.

Plate III. fig. 13. B Reversed or heterostrophe spire, A teeth of a univalve.

The shells of this genus inhabit the sea, land, and fresh water; they adhere to rocks near the shore; and some of them live in very deep water.

The Turbo scalaris, or wentletrap, is very much esteemed by collectors, and is rather a scarce shell.

Genus 29.—HELIX.

Animal a Limax; shell univalve, spiral, subdiaphanous, brittle; aperture contracted, semilunar or roundish.

Linnæus divides the Helices or Snails into six families: *angulated on both sides; **whorls with a carinate acute margin; ***whorls rounded and umbilicated; ****rounded and imperforate; *****tapering; ******ovate and imperforate.

Helix arbustorum.—THE GROVE HELIX. Plate IX. fig. 29. Sub-globose, sub-pellucid, with five volutions; mottled with ash-colour, and streaked with deep chestnut zigzag lines; a single deep brown band commences at the edge of the outer lip, and continues round the middle of the body and the volutions to the apex; ¾ths of an inch in diameter. Inhabits groves, thickets, hedge-banks, and places covered with strong herbage, in Britain.

Helix vivipara.—THE VIVIPAROUS HELIX. Plate II. fig. 8. (Paludina vivipara, Lamarck.) Shell with six ventricose whorls, separated by a deep depressed line; sub-ovate and obtuse; of an olive-green, with generally three fasciæ or bands on the body of the shell, and two on the superior volutions, which become obscure in the fourth; slightly wrinkled transversely; aperture suborbicular; pillar-lip reflected; sub-umbilicated. Found in the Thames and New River.

A Apex, B base, L a whorl, B B bands or fasciæ.

Helix polita.—THE POLISHED HELIX. Plate II. fig. 9. (Pyramis politus, Brown.) Shell strong, white, glossy and smooth, with from nine to twelve volutions, scarcely defined by a separating line, slender and gradually tapering to a point; aperture oval, outer lip thick, but not margin-

ated, inner or pillar-lip replicated. Found in Devonshire, Dorsetshire, Northumberland, and at Dunbar, and on the coast of Aberdeenshire, in Scotland.

A Apex, B base, E E suture of the spire or whorls, C a; erture.

Helix nemoralis.—THE WOOD HELIX. Plate III. fig. 2. Shell imperforate, sub-globose, thin and sub-pellucid, colour various; volutions five, with from one to five dark brown bands or fasciæ; aperture pyriform; inner margin of the lip dark-reddish brown. This shell is very common in England and the south of Scotland, at the roots of hedges, on grassy banks, or by walls.

N Outer lip, X epidermis, Y epidermis removed.

Helix glutinosa.—THE GLUTINOUS HELIX. Plate III. fig. 5. (Lymnæa glutinosa, Lamarck.) Shell suborbicular, thin, and diaphanous, of a glossy, pale horn-colour, smooth, but sometimes with obsolete wrinkles; the body very large; spire very small; volutions three; aperture very large, extending nearly to the apex. Found by Mr. Montagu, in the marshes at Deal.

G The back, H the venter, L whorl or volution.

Helix putris.—THE DITCH HELIX. Plate III. fig. 10. (Lymnæa ovata, Lamarck.) Shell sub-pellucid, and horn-coloured; spire with four volutions; the body tumid and large; wrinkled longitudinally; apex very small, fine, and pointed, aperture oval and large, outer-lip very thin; outside covered with a dusky epidermis, inside pale yellow, and very glossy.

Common in most ponds, ditches, brooks, and rivers.

Helix planorbis.—THE FLATTENED HELIX. Plate III. fig. 14. (Planorbis carinatus, Lamarck.) Shell depressed and sub-pellucid, horn-coloured, rufous, or light chestnut brown; generally with a light umber-coloured epidermis; volutions five, placed laterally on each other, gradually decreasing to the centre, making the shell concave at top, rounded and defined by the suture; striated across the whorls; a carinated ridge round the margin at the base;

aperture angulated, and slanting towards the base. Inhabits ponds, rivers, and ditches in Britain.

Helix subulata.—THE AWL-SHAPED HELIX. Plate III. fig. 7. (Pyramis subulatus, Brown.) Shell tapering and subulate, very smooth, and glossy; whorls about ten, and scarcely defined; colour white, with two pale-chestnut spiral lines running from the body to the apex, becoming very faint on the upper whorls; aperture ovate, and rather contracted. Length three quarters of an inch. Inhabits the sea at Weymouth, the Frith of Forth, and the coast of Aberdeenshire.

D Spire, F body, O pillar-lip.

Habitation. The Helices are found in the ocean, in lakes, rivers, and on the land. They are inhabitants of almost all countries of the globe, and are in general very numerous. On land they are found to inhabit trees, old walls, mossy banks, and rocks, as well as under stones.

The animals of this genus are termed snails in Britain; they feed on vegetables. It has been asserted, and on apparently good authority, that snails have been known to revive after remaining in torpidity for a number of years; snails are possessed of very considerable reproductive powers, and are capable of reproducing the head after it is taken off.

Genus 30.—NERITA.

Animal a Limax; shell univalve, spiral, gibbous, flattish at bottom; aperture semi-orbicular, or semilunar; pillar-lip transversely truncate, flattish.

This genus is divided into three families: *umbilicate; **imperforate, with the lips toothless; ***imperforate, with the lips toothed.

Nerita littoralis.—THE SHORE NERITA. Plate IX. fig. 30. (Neritoides littoralis, Brown) Globular, thick, smooth; spire flat; yellow, covered with an olive epidermis, beneath which the shell is either yellow, orange, or red, frequently with elegant zigzag lines of red or brown. Three-fourths of an inch long. Inhabits the British coasts.

The Neritæ inhabit the sea, lakes, and rivers. The marine species are found near the shore, and several are attached to marine plants; some are only found in deep water so that live specimens can only be *had* by trawling for them.

Genus 31.—HALIOTIS.

Animal a Limax; shell ear-shaped; univalve and dilated, with a longitudinal row of orifices opening on the surface; spire lateral, and nearly concealed.

The animals composing the shells of the genus Haliotis, inhabit the sea only. They adhere closely to rocks, and can only be removed by suddenly snatching them from their hold. In some places the animal is esteemed good eating. One species, the Haliotis tuberculata, is very common in Guernsey, and sold in the market as food.

Haliotis tuberculata.—THE TUBERCULAR HALIOTIS. Plate IX. fig. 31. Dull reddish brown on the outside, sometimes clouded or mottled with a deeper shade: longitudinally striated, and transversely wrinkled, with a few raised tubercles; inside perlaceous, reflecting the most beautiful shades of pink, blue, green, and yellow; aperture open the whole length of the shell, outer-lip irregular. From three to four inches long. Inhabits the sea at Guernsey.

It is asserted, that as a new hole is added by the animal to the shell, it carefully closes up the next open one to the spire; by which means the number of orifices is, in general, the same in all shells of one species.

DIVISION SECOND.—SHELLS WITHOUT A REGULAR SPIRE.

Genus 32.—PATELLA.

Animal a Limax; shell univalve, subconic, shaped like a bason; without a spire.

Linnæus divides this genus into five families: *furnished with an internal lip; shell entire; **with the margin angular or irregularly toothed; ***with a pointed recurved tip or crown; ****very entire, and not pointed at the tip or vertex; *****with the crown perforated.

Patella vulgata.—THE COMMON PATELLA. Plate IX. fig. 32. Subject to great external variety; ribbed from the vertex to the margin in some specimens, and with divergent striæ; others striated merely, without ribs; of a dark brown or olive green on the outside, and the inside blue, shining with deep purple radiations; and presenting a great variety

of colour; apex obtuse, and placed towards the narrow end of the shell, which is usually ovate. From one to two inches long. Inhabits the shores of Northern Europe.

Patella Chinensis.—THE CHINESE PATELLA. Plate III. fig. 6. (Calyptræa sinensis, Lamarck.) Shell sub-conic, sub-pellucid, and very thin, colour whitish, much compressed, rounded at the margin; vertex central, terminating in a sub-spiral volution, with usually a number of concave scales. Inside white, glossy, and smooth, with a sub-spiral columella or pillar-lip, extending from nearly the margin to the end, and forming the external sub-volution; it is broad, flat, and oblique. Found in Helford harbour, Cornwall; in Salcomb bay, Devonshire, by Col. Montagu; and near Dunbar, by Captain Laskey.

The shells of this genus inhabit the sea, lakes, and rivers. Those of the sea in general adhere to rocks and stones on the shore; and are so tenacious, that they cannot be removed without great force, unless taken by surprise. Those inhabiting fresh water are generally found attached to stones or aquatic plants. The Patellæ are called Limpets in Britain.

w Chamber.

Genus 33.—DENTALIUM.

Animal a Terebella; shell univalve, tubular, straight, or slightly curved, with the cavity undivided, and open at both ends.

Dentalium Entalis.—THE TOOTH DENTALIUM. Plate IX. fig. 33. White or yellowish, slightly curved, and tapering to a fine point; slightly striated. One and a half inch long. Inhabits the British seas.

The shells of this genus are only found in the ocean. They are solitary, and lie in the mud, in an oblique or perpendicular position.

Genus 34.—SERPULA.

Animal a Terebella; shell univalve, tubular, generally adhering to other substances; often separated internally by divisions at uncertain distances.

Serpula vermicularis.—THE WORM-LIKE SERPULA. Plate IX. fig. 34. White, cylindrical, tapering, and variously curved

and twisted; always affixed to other substances. Inhabits the British seas.

The Serpulæ inhabit the ocean. They generally adhere to stones, shells, or plants; sometimes a plurality of species is found on one stone or shell. There are also several species of Serpula which are unattached.

Genus 35.—TEREDO.

Animal a Terebella, with two calcareous, hemispherical valves cut off before, and two lanceolate ones: shell tapering, flexuous, and capable of penetrating wood.

Teredo navalis.—THE SHIP TEREDO. Plate IX. fig. 35. Cylindrical, taper; smooth, white, and flexuous, finely striated longitudinally.

The shells of this genus inhabit the bottoms of ships; and poles or planks, which are under water in harbours and docks. One species has been found in the mud, at the bottom of the ocean. This last mentioned shell is the Teredo gigantea, and has been described to consist of a tube, five feet four inches in length, nine inches in circumference at the larger, and two and one half inches at the smaller end. It is the longest of all testaceous shells.

The Teredo navalis, or ship-worm, insinuates itself into the bottoms of ships, even although the oak is perfectly sound, and in a very short time perforates or even completely destroys it. This destructive creature was, it is said, originally brought by our vessels from tropical climates; but it has now become an inhabitant of most of the harbours of this island, and is very common in Plymouth Dock.

It was first proved by that learned and very indefatigable naturalist, Colonel George Montagu, in his supplement to Testacea Britannica, that the animal inhabiting the Teredo, was not a Terebella, but an Ascidia. More recently, however, it has been found to be neither.

Genus 36.—SABELLA.

Animal a Nereis, with a ringent mouth, and two thicker tentacula behind the head; shell tubular, composed of particles of sand, broken shells, and vegetable substances, united to a membrane by a glutinous cement.

Sabella tubiformis.—Plate IX. fig. 36.

These shells (if they can be called so) inhabit the sea. The Linnæan Sabellæ are not testaceous shells, but merely coverings made up of extraneous substances; and may therefore fairly be expunged from the collection of the Conchologist. They are included in Lamarck's class Annelides, the formation of the animal being different from that of the true Mollusca.

TABLE OF THE LINNÆAN GENERA OF SHELLS, WITH LAMARCK'S DIVISIONS OF THESE GENERA.

I. CHITON,	Chiton. Chitonellus.
II. LEPAS,	Tubicinella. Coronula. Balanus. Acasta. Creusia. Pyrgoma. Anatifa. Pollicipes. Cineras. Otion.
III. PHOLAS,	Pholas. Gastrochæna.
IV. MYA,	Panopæa. Glycimeris. Mya. Anatina. Lutraria, *part.* Amphidesma, *part.* Corbula. Unio. Hyria. Vulsella.
V. SOLEN,	Solen. Anatina, *part.* Sanguinolaria Hiatella.
VI. TELLINA,	Mya, *part.* Amphidesma, *part.* Pandora. Psammobia. Psammotea. Tellina. Lucina. Cyclas. Cyrena.
VII. CARDIUM,	Cardium.
VIII. MACTRA,	Lutraria, *nearly all.* Mactra. Crassatella, *part.* Amphidesma, *part.*
IX. DONAX,	Petricola, *part.* Crassatella. Venerupis, *part.* Donax. Capsa.
X. VENUS,	Petricola, *part.* Venerupis, *part.* Sanguinolaria, *part.* Corbis. Lucina, *part.* Donax, do. Crassina. Cyrena, *part.* Galathea. Cyprina. Cytherea. Venus.
XI. SPONDYLUS,	Plicatula. Spondylus.
XII. CHAMA,	Cardita. Cypricardia. Isocardia. Chama. Tridacna. Hippopus.
XIII. ARCA,	Nucula. Pectunculus. Arca.
XIV. OSTREA,	Cucullæa. Perna. Malleus. Pedum. Lima. Pecten. Gryphæa. Ostrea.
XV. ANOMIA,	Placuna. Anomia. Crania. Orbicula. Terebratula. Hyalæa.
XVI. MYTILUS,	Saxicola. Anodonta. Modiola. Mytilus. Avicula. Meleagrina. Ostrea, *some.*
XVII. PINNA,	Pinna.
XVIII. ARGONAUTA,	Limacina. Argonauta. Carinaria.

I. NAUTILUS,	Orthoceras. Nodosaria. Spirula. Cristellaria. Nautilus. Polystomella.
. CONUS,	Conus.
I. CYPRÆA,	Cypræa.
II. BULLA,	Bullæa. Acera. Bulla. Bulimus. Achatina. Physa, *part.* Ovula. Terebellum.
III. VOLUTA,	Auricula. Ancilla. Tornatella. Turbinella. Cancellaria. Columbella. Mitra. Voluta. Marginella. Volvaria. Achatina. Oliva.
XIV. BUCCINUM.	Concholepas. Achatina, *part.* Phasianella. Pleurotoma. Turbinella, *part.* Cancellaria, *part.* Pyrula, *part.* Murex, do. Triton. Cassidaria. Cassis. Purpura. Monoceras. Harpa. Dolium. Buccinum. Eburna. Terebra.
XV. STROMBUS,	Pirena. Cerithium, *part.* Pleurotoma, *part.* Rostellaria, Pteroceras. Strombus. Cassidaria, *part.* Purpura.
XXVI. MUREX,	Cerithium. Pleurotoma. Turbinella, *part.* Fasciolaria. Fusus. Pyrula. Struthiolaria. Ranella. Murex. Triton. Ricinula. Purpura, *part.*
XXVII. TROCHUS,	Pyramidella. Solarium. Rotella. Trochus. Monodonta, *part.* Turbo, *part.* Cerithium, *part.*
XXVIII. TURBO,	Pupa. Clausilia. Auricula, *part.* Cyclostoma. Planorbis, *part* Paludina. Scalaria. Delphinula. Trochus, *part.* Monodonta, *part.* Turbo. Turitella.
XXIX. HELIX,	Helix. Carocolla. Anostoma. Helicina, *some* Pupa, *some.* Bulimus. Succinea. Auricula. Cyclostoma. Planorbis. Lymnæa. Melania. Melanopsis. Paludina, *part* Valvata. Ampullaria. Natica. Ianthina. Sigaretus.
XXX. NERITA,	Navicella. Neritina. Nerita. Natica.
XXXI. HALIOTIS,	Stomatia. Haliotis.

XXXII. PATELLA,	Lingula. Patella. Umbrella. Parmophorus. Emarginula. Fissurella. Pileopsis. Calyptræa. Crepidula. Ancylus. Navicella, *part.* Stomatella.
XXXIII. DENTALIUM,	Dentalium.
XXXIV. SERPULA,	Siliquaria. Spirorbis. Serpula. Vermilia. Aspergillum. Septaria. Vermetus.
XXXV. TEREDO,	Fistulana. Septaria, *part.* Teredo.

LAMARCK'S GENERA OF SHELLS.

ARRANGED ACCORDING TO THE DESCENDING SCALE, WITH THE ADDITION OF SOME RECENTLY FORMED GENERA.

TESTACEOUS MOLLUSCA.

ANIMALS soft, inarticulated, provided with an anterior head, which is more or less projecting, or salient; most frequently furnished with eyes and tentacula, or sometimes having arms disposed in the form of a coronet; their mouth short, elongated, or tubular, extensile and usually armed with hard parts. Mantle diversified, having its edges free on the sides of the body, or the lobes united, forming a sac or bag, which partly envelopes the animal; gills or organs of respiration various, rarely symmetrical; circulation double, one partial, the other general; heart unilocular, sometimes with the auricles separated, and very distant, no continuous medullary cord along the body, but a few scattered nerves and ganglions; body sometimes naked, either unprovided with solid internal parts, or enclosing a shell or other hard substance; but generally provided with an external shell covering the body, or sheathed in it, and which is never composed of two opposite valves.

ORDER I.—HETEROPODA.

Head distinct, with two eyes, but destitute of arms arranged around the head; body free elongated, fitted for

swimming horizontally; no foot under the abdomen or throat for walking; one or more fin-like expansions, without any regular order, and not arranged in pairs as in fishes.

Genus 1.—PHILLIROE; and *Genus* 2.—PTEROTRACHEA, are soft animals without any testaceous covering or shell.

Genus 3.—CARINARIA.—*Lamarck.*

Generic Character.—Head distinct, provided with two tentacula, a contractile elongated mouth, and two eyes; heart and branchiæ united into a single mass, projecting from the abdomen, contiguous to the tail, and enveloped in a shell; body elongated, gelatinous, pellucid, with a tail at its posterior extremity.

Shell univalve, conical, compressed, unilocular, extremely thin, hyaline; apex convoluted into a spire; back, in some species, forming a notched keel; aperture oblong and entire.

The shells of this genus are distinguished from those of the Argonauta, by the spire never entering the aperture.

Carinaria fragilis.—THE FRAGILE CARINARIA.—Plate X. fig. 1. Shell excessively thin, hyaline, striated longitudinally, destitute of a dorsal keel. Inhabits the African seas.

ORDER II.—CEPHALOPODA.

Head emanating from a bag-shaped mantle, and surmounted by inarticulated arms, which are provided with suckers, and surround the mouth; two sessile eyes; mouth provided with two horny mandibles; three hearts; the sexes in separate individuals.

Sub-Division I.—Cephalopoda Sepiaria.

Animals without any internal or external covering or shell, but with an internal cartilaginous or calcareous plate. This subdivision embraces four genera of Sepiæ or Cuttle fish.

Sub-Division II.—Cephalopoda Monothalama.

Having unilocular shells, entirely external, and enveloping the animal.

Genus 5.—ARGONAUTA.—*Linnæus.*

Generic Character.—Shell spiral, univalve, unilocular, very thin, doubly carinated, with the spire entering the aperture.

Argonauta Argos.—The Argus Argonauta, or Paper Nautilus.—Plate X. fig. 2. Shell white, involute, extremely thin and fragile, sides with undulated ridges, and obsoletely striate; keel with small tubercles, partly reddish-black. Inhabits the Mediterranean.

Sub-Division III.—Cephalopoda Polythalama.

Shell multilocular, partly or wholly internal, and enveloped in the posterior part of the body.

FAMILY I.—AMMONACEA.

With the septa sinuous, lobed and cut at the margin, meeting upon the inner wall of the shell, and articulated by acutely notched sutures.

Genus 6.—BACULITES.—*Lamarck.*

Generic Character.—Shell straight, cylindrical, sometimes a little compressed, slightly conical; with the walls articulated by sinuous sutures; dissepiments transverse; little distant, imperforate, lobed and subdivided at the margin.

Baculites Faujasii.—FAUJACIAN BACULITES. Plate X. fig. 3. Erect, cylindrical, opposite sides smooth and depressed; sutures lobed and denticulate.

Genus 7.—TURRILITES.—*Lamarck.*

Generic Character.—Shell spiral, turreted, volutions contiguous, and all conspicuous; walls articulated with sinuous sutures; septa transverse, lobed, and lacinated at the margin; aperture nearly round.

Turrilites costulata.—THE RIBBED TURRILITES. Plate X. fig. 4. Erect, turreted; volutions convex, with transverse ribs each with a tubercle at its base.

Genus 8.—AMMONOCERATITES.—*Lamarck.*

Generic Character.—Shell horn-shaped, arcuated, scarcely forming half a turn; the walls articulated with sinuous, laciniate, branched sutures; septa transverse, sinuous, imperforate; their margins lobed, laciniate; having a marginal tube or siphon, which does not perforate the septa.

Ammonoceratites glossoidea.—THE GLOSSOID AMMONOCERATITES. Plate X. fig. 5. Large, thick, cylindrical, arcuated, flattish on the sides, inside somewhat concave; apex compressed, tongue-shaped. Twenty inches long. Fossil, East Indies, and in Mount St. Catherine, near Rouen.

Genus 9.—ORBULITES.—*Lamarck.*

Generic Character.—Shell subdiscoid, spiral, with the volutions contiguous; the last enveloping the rest; the internal parietes articulated by sinuous sutures; septa transverse, lobed at their circumference, perforated by a marginal tube.

Orbulites striata.—THE STRIATED ORBULITES. Plate X. fig. 6. Suborbicular, umbilicated; volutions transversely and minutely striated and ribbed; back rather acute. One and a half inch in diameter. Fossil.

Genus 10.—AMMONITES.—*Lamarck.*

Generic Character.—Shell discoid, spiral; volutions contiguous, wholly visible; inner parietes articulated by sinuous sutures; septa transverse, lobed at the circumference, and without siphon at the disk, but perforated by a marginal tube near the margin.

Ammonites armatus.—THE ARMED AMMONITES. Plate X. fig. 7. Subcarinated, volutions depressed at their inner margins; with strong transverse striæ and clavate ribs. Fossil.

FAMILY II.—NAUTILACEA.

Shell discoid, with a central spire, and short cells, which do not extend from the centre to the circumference.

Genus 11.—NAUTILUS.—*Linnæus.*

Generic Character.—Shell discoid, spiral, multilocular, with simple parietes; volutions contiguous, the last or body one enveloping the rest; the cells numerous, septa transverse, externally concave, perforated in the disk by a tube; margins entire.

Nautilus umbilicatus.—THE UMBILICATED NAUTILUS. Plate X. fig. 8. Suborbicular; the centre of the volutions umbilicated on both sides; aperture round, heart-shaped pale fawn-coloured, with chestnut undulated transverse clouds. Six inches long. Inhabits the Indian Ocean.

Genus 12.—NUMMULITES.—*Lamarck.*

Generic Character.—Shell lenticular, attenuated at the margins; spire internal, discoid, multilocular, covered over by several plates; the outer layers complicated, produced, extending and uniting on each side to the central disks; cells very numerous, small, alternate, and formed by transverse imperforate septa.

Nummulites complanatus.—THE FLAT NUMMULITES. Plate X. fig. 9. Orbicular, broad, depressed at the sides, and smooth; margin undulated. One and a half inch in diameter. Fossil in France.

Genus 13.—VORTICIALIS.—*Lamarck.*

Generic Character.—Shell discoid, spiral, multilocular; volutions contiguous, but not appearing externally; septa transverse, imperforate, but not extending from the centre to the circumference; aperture marginal.

Vorticialis strigilata.—THE CREASED VORTICIALIS. Plate X. fig. 9. Somewhat depressed, transversely ribbed, and spirally striated. Fossil.

Genus 14.—POLYSTOMELLA.—*Lamarck.*

Generic Character.—Shell discoid, multilocular, with concealed volutions; with numerous transverse ribs; aperture formed of variously disposed holes.

Polystomella crispa.—THE WRINKLED POLYSTOMELLA. Plate X. fig. 11. Discoid, with both sides convex, the margin carinated; the last turn of about twenty cells, marked with flexuous ridges, having their interstices crenated. Common in shell sand.

Genus 15.—SIDEROLITES.—*Lamarck.*

Generic Character.—Shell discoid, multilocular; volutions contiguous, but not visible externally; the disk convex on both sides, and studded with tubercular dots; the circumference margined with unequal radiating lobes; septa transverse, imperforate; aperture distinct, somewhat lateral.

Siderolites calcitrapoides.—THE CHALK SIDEROLITES. Plate X. fig. 1. With four lobes, and punctated throughout. Fossil in the mountain of St. Peter, at Maestricht.

Genus 16.—DISCORBIS.—*Lamarck.*

Generic Character.—Shell discoid, spiral, multilocular,

with simple parietes; the volutions wholly visible, exposed, and contiguous; with transverse, numerous, and imperforate septa.

Discorbis vesicularis.—THE VESICULAR DISCORBIS. Plate X. fig. 13. Volutions nodulous, subvesicular; the last volution sometimes closed. Fossil at Grignon.

FAMILY III.—RADIOLACEA.

Shell discoid, with a central spire, and elongated radiating cells, extending from the centre to the circumference.

Genus 17.—PLACENTULA.—*Lamarck.*

Generic Character.—Shell orbicular, convex above and below, multilocular; aperture oblong, narrow, disposed like a radius in the lower disk, or sometimes in both upper and under.

Placentula asterisans.—THE STAR-SHAPED PLACENTULA. Plate X. fig. 14. Volutions convex; partitions radiating from the centre. Fossil.

Genus 18.—LENTICULITES.—*Lamarck.*

Generic Character.—Shell sublenticular, spiral, multilocular; outer margin of the volutions complicated, and extending on both sides to the centre; septa imperforate, curved, and lengthened on both sides in the form of rays; aperture narrow, projecting over the last volution.

Lenticulites rotulata.—THE ROLLED LENTICULITES. Plate X. fig. 15. Orbicular; margin acute; disks somewhat prominent. Fossil at Mendon.

Genus 19.—ROTULITES.—*Lamarck.*

Generic Character.—Shell orbicular, multilocular, spiral, convex, or conical, above; flat, radiated, and tubercular beneath; aperture marginal, trigonal, and directed upwards.

Rotulites trochidiformis.—THE TROCHUS-SHAPED RO-

TULITES. Plate X. fig. 16. Shell conoid; volutions carinated; lower side granulated. Fossil at Grignon.

FAMILY IV.—SPHERULACEA.

Shell globular, spheroidal, or oval; with the volutions mutually enveloping, or the cells contiguous, curved in the segment of a circle, and collectively forming a single envelope to the central cavity.

Genus 20.—MELONIA.—*Lamarck.*

Generic Character.—Shell subspherical, multilocular; spire central; volutions contiguous, convolute, tuniciform; cells numerous, narrow; septa imperforate.

Melonites sphæroidea.—THE ROUND MELONIA. Plate X. fig. 17. Entirely globular, and divided by depressed ribs. Fossil.

Genus 21.—GYROGONA.—*Lamarck.*

Generic Character.—Shell spheroidal, concave within, composed of linear, curved, canaliculate pieces; the external surface with carinated, parallel, partly transverse ribs; becoming spirally curved and uniting at each of the centres or poles; aperture round, sometimes closed, situated at the inferior pole of the shell.

Gyrogonites medicaginula.—Somewhat spherical, with transverse keels, spiral at the extremities. Fossil at Montmorency.

Genus 22.—MILIOLA.—*Lamarck.*

Generic Character.—Shell transverse, ovate-globular, or elongated, multilocular; having transverse cells surrounding the axis, and alternately covering each other; aperture very small, orbicular or oblong, situated at the base of the last volution.

Miliola ovata.—THE OVAL MILIOLA. Plate X. fig. 18.

Ovate, small, with an oblong-ovate aperture. Fossil at Grignon.

FAMILY V.—CRISTACEA.

Shell semidiscoid, with an eccentric spire.

Genus 23.—ORBICULINA.—*Lamarck.*

Generic Character.—Shell subdiscoid, multilocular; spire eccentric; volutions contiguous and compound; chambers short and very numerous; septa imperforate.

Orbiculina uncinata.—THE UNCINATE ORBICULINA. Plate X. fig. 19. Spirally striated, and the volutions separated by a deep sinus. Fossil.

Genus 24.—CRISTELLARIA.—*Lamarck.*

Generic Character.—Shell semi-discoidal, multilocular; volutions contiguous and simple, progressively enlarging; spire eccentric, sublateral; septa imperforate.

Cristellaria squammula.—THE SCALED CRISTELLARIA. Plate X. fig. 20. Shell externally covered with minute scale-like marks. Fossil.

Genus 25.—RENULINA.—*Lamarck.*

Generic Character.—Shell kidney-shaped, flat, sulcated, and multilocular; volutions linear, contiguous, curved around a marginal axis, those most remote from it being longest.

Renulites opercularis.—THE LID-SHAPED RENULINA. Plate X. fig. 21. Semilunar, flat, with arcuated concentric ridges. Fossil at Grignon.

FAMILY VI.—LITUOLACEA.

Shell somewhat spiral; the last volution continuous in a straight line.

Genus 26.—LITUOLA.—*Lamarck.*

Generic Character.—Shell multilocular, partially spiral and discoid; volutions contiguous, the last terminating in a straight line; chambers irregular; septa simple and transverse, the last one perforated with from three to six orifices.

Lituolites nautiloides.—THE NAUTILUS-SHAPED LITUOLA. Plate X. fig. 22. Discoid, tailed, ribbed; septa with six perforations. Fossil at Mendon.

Genus 27.—SPIROLINA.—*Lamarck.*

Generic Character.—Shell multilocular, partly spiral and discoid; volutions contiguous, the last one terminating in a straight line; septa straight, perforated by a tube.

Spirolina clavata. — THE CLUB-SHAPED SPIROLINA. Plate X. fig. 23. Club-shaped, spiral, smooth, ending in a lengthened erect body. Fossil.

Genus 28.—SPIRULA.—*Lamarck.*

Generic Character.—Shell cylindrical, thin, subpellucid, multilocular, spiral, discoid; the volutions apart, with a straightish termination; septa transverse, and equidistant, externally concave, with an interrupted lateral siphon; aperture round.

Spirula Peronii.—PERON'S SPIRULA. Plate X. fig. 24. White; very fragile, involute; diameter about one inch. Inhabits the West Indian seas.

Lamarck has ascertained that the animal is cephalopodous, and furnished with a sac, which envelopes the hind part of its body, at which is seen the shell, having only a portion of its last turn exposed.

FAMILY VII.—ORTHOCERATA.

Shell straight, or nearly so, without any spiral volutions.

Genus 29.—CONILITES.—*Lamarck.*

Generic Character.—Shell conical, straight, slightly in-

flected; outer crust thin, by which the nucleus is invested; nucleus somewhat separable, multilocular, and divided by transverse septa.

Conilites pyramidata.—THE PYRAMIDAL CONILITES. Plate X. fig. 25. Pyramidal; with the concave bands contracted. Fossil.

Genus 30.—HIPPURITES.—*Lamarck.*

Generic Character.—Shell conico-cylindrical, straight, or somewhat arcuated, multilocular, with transverse septa; having a lateral internal channel formed by two parallel, longitudinal, obtuse and convergent ridges; the last chamber closed by an operculum.

Hippurites curva.—THE BENT HIPPURITES. Plate X. fig. 26. Conical, curved, coarse; lower part truncated and flat.

Genus 31.—NODOSARIA.—*Lamarck.*

Generic Character.—Shell elongated, straight or slightly arcuated, subconic, nodose, consisting of a series of very smooth spherical cells; the transverse septa perforated.

Nodosaria Radicula.—THE SHINING NODOSARIA. Plate X. fig. 27. Erect, oblong, and attenuated; with five globular joints. Two lines long. Inhabits the Adriatic.

Genus 32.—ORTHOCERA.—*Lamarck.*

Generic Character.—Shell elongated, straight, or a little arcuated, subconical; externally striated with longitudinal ridges; chambers formed by transverse septa, perforated by a tube, which is either central or marginal.

The shells of this genus resemble a slightly curved horn.

Orthocera Raphanus.—THE RADISH-ROOT ORTHOCERA. Plate X. fig. 28. Erect, elongated, conical, with longitudinal continuous ribs; the joints tumid, the siphon sublateral; white. Inhabits the Mediterranean sea.

Genus 33.—BELEMNITES.—*Lamarck.*

Generic Character.—Shell straight, conical, elongated, capable of being separated into two parts, the outer one a solid sheath, produced above and excavated with a conical cell beneath; the inner nucleus conical, and divided by numerous transverse septa, perforated by a central tube.

Belemnites subconicus.—THE SUBCONIC BELEMNITES. Plate X. fig. 29. Lower part semi-cylindrical; upper part conical and attenuated. Fossil, found in Britain in chalk-marl.

ORDER III.—TRACHELIPODA.

Posterior part of the body spirally convolute, separated from the foot, and constantly enveloped in a shell; foot free, depressed, attached to the lower base of the neck, on the anterior part of the body, and forming an organ of locomotion; shell spiral, and enveloping.

SECTION I.—ZOOPHAGOUS TRACHELIPODA.

The animals are entirely marine, having a protruding siphon, and respiring water only, which reaches the branchiæ by this siphon; they are devoid of maxillæ; provided with a retractile proboscis; and feed on other animals.

FAMILY I.—INVOLUTA.

Shell destitute of a canal, but having its aperture notched or effuse at the base, and its volutions compressed, and convoluted so as that the external one nearly envelopes the others.

Genus 1.—CONUS.—*Linnæus.*

Generic Character.—Shell turbinate, or of the form of a

reversed cone, aperture longitudinal, linear, toothless, narrow, and effuse at the base.

Conus generalis.—THE GENERAL CONE. Plate XI. fig. 1. Shell oblong, turbinate, reddish-brown, or orange, black at the base, with interrupted white bands, the spire flat, marginate, with the apex acute. Two and a half inches long. Inhabits the Indian seas.

There are two sections of this beautiful and very extensive genus.

I. Shells coronate, or provided with knobs, round the edges of the spiral volutions.

II. Shell not coronate.

Genus 2.—OLIVA.—*Lamarck.*

Generic Character.—Shell subcylindrical, convolute, smooth, and glossy; spire short, with canaliculated sutures; aperture longitudinal, emarginate at the base; columella obliquely striated, or plaited.

The volutions of this genus, being separated by a canal, at once distinguish them from those of the Voluta and Mitra; the same distinction separates it also from Ancillaria.

Oliva cruentata.—THE BLOODY OLIVE. Plate XI. fig. 2. Shell pale fawn-coloured with large triangular spots of purple, edged with deeper fawn; two dark brown spots on the edge of the outer lip; suture of the spire deep; pillar plaited to nearly the top. One and a half inch long. Inhabits the Indian seas.

Genus 3.—ANCILLARIA.—*Lamarck.*

Generic Character.—Shell oblong, subcylindrical; spire short, not caniculate at the sutures; aperture longitudinal, effuse and hardly emarginate at the base; lower portion of the columella with an oblique callosity or varix.

The columella never being plaited distinguishes the shells of this genus from those of Oliva. The callous oblique band, at the base of the columella, separates it from Terebellum.

Ancillaria cinnamomea.—THE CINNAMON ANCILLARIA.

Plate XI. fig. 3. Shell chestnut-brown, with white bands above; varix of the columella reddish, and somewhat striated. One inch long. Inhabits Trincomalee.

Genus 4.—TEREBELLUM.—*Lamarck.*

Generic Character.—Shell convolute, sub-cylindrical; apex pointed; aperture longitudinal, narrow above; base emarginate; columella smooth, truncated beneath.

Terebellum subulatum.—THE AWL-SHAPED TEREBELLUM. Plate XI. fig. 4. Shell cylindrical, thin, and glossy; spire subulate; columella smooth, truncate at the base. One inch long. Inhabits the Indian seas.

Genus 5.—CYPRÆA.—*Linnæus.*

Generic Character.—Shell ovate or oblong-ovate, convex; margins involute; aperture longitudinal, narrow, dentate on both sides, effuse at both extremities; spire very small, generally hidden or covered in the perfect shells.

Cypræa Exanthema.—THE MEASLEY CYPRÆA. Plate XI. fig. 8. Oblong-ovate, brown, thickly studded with round eye-like white spots; dorsal line greyish; marginal teeth dark brown. Four inches long. Inhabits the West Indies.

Genus 6.—OVULA.—*Bruguiere.*

Generic Character.—Shell turgid, attenuated at both ends; margins convolute; aperture longitudinal, narrow, effuse at the extremities; the inner or columellar margin without teeth.

*Outer lip thickened, or wrinkled.—**Outer lip smooth and without teeth.

The shells of this genus are distinguished from Cypræa by the want of a spire, and the columellar lip never having plaits or teeth.

Ovula oviformis.—THE EGG-SHAPED OVULA. Plate XI. fig. 5. Shell ovate, much inflated, ventricose in the centre, very glossy, pure white; extremities prominent;

mouth dark orange within. Four inches long. Inhabits the Indian seas.

FAMILY II.—COLUMELLARIA.

Without a canal at the base of the aperture, but having a subdorsal more or less distinct notch, and with folds or plaits on the columella.

Genus 7.—VOLVARIA.—*Lamarck.*

Generic Character.—Shell cylindrical, convolute; the spire hardly protruding; aperture narrow, nearly the whole length of the shell; columella with one or more folds or plaits near its base.

This genus forms a natural connection betwixt the Columellaria and the Involuta.

Volvaria cylindrica.—THE CYLINDRIC VOLVARIA. Plate XI. fig. 11. Shell cylindrical, white, with one plait on the columella. Half an inch long. Inhabits the British seas.

This shell, however, is not an apt representative of the genus Volvaria, it being a Bullina.

Genus 8.—MARGINELLA.—*Lamarck.*

Generic Character.—Shell oblong-ovate, smooth; spire short, outer lip with an external marginal longitudinal rim or varix; base slightly notched; columella plaited; folds nearly equal.

The thickening of the outer lip distinguishes these shells from the genera Volvaria and Mitra. There are two sections: 1. with the spire protruded; 2. with the spire not projecting. To the first belongs the following species.

Marginella cærulescens.—THE BLUISH MARGINELLA. Plate XI. fig. 6. Shell bluish-white; spire short, and acute; lip brownish-purple within; columella with four plaits. One inch long. Inhabits the Indian Ocean.

Genus 9.—VOLUTA.—*Linnæus.*

Generic Character.—Shell ovate, more or less ventricose;

apex nipple-like; no canal; columella plicate, the lower plaits larger and more oblique than the others; no columellar lamina.

This genus is divided into four sections.—1. Shell ventricose; 2. shell ovate, spinous, or tubercular; 3. shell oval, and subtubercular; 4. shell elongated, ventricose, nearly fusiform.—The following illustrates section 2.

Voluta Vespertilio.—THE BAT VOLUTE. Plate XI. fig. 7. Shell turbinate, with acute spires on the volutions; summit slightly obtuse; columella four-plaited. Three inches long. Inhabits the Indian seas.

Genus 10.—MITRA.—*Lamarck.*

Generic Character.—Shell turreted, or sub-fusiform, with the spire pointed; base emarginate, without a canal; columella plicate, the plaits being parallel and transverse, the lower ones smallest; pillar lip thin and adnate.

Mitra pontificalis.—THE PONTIFICAL MITRA. Plate XI. fig. 9. Turreted, ovate; covered with a yellow-olive epidermis, beneath which are interrupted bands of orange spots; spire crowned with tubercles. Two and a half inches long. Inhabits the Chinese seas.

Genus 11.—COLOMBELLA.—*Lamarck.*

Generic Character.—Shell oval; spire short; base of the aperture more or less emarginate, and destitute of a canal; columella plicate; outer lip with an internal prominence, which contracts the aperture.

Colombella mercatoria.—THE COMMERCIAL COLOMBELLA. Plate XI. fig. 10. Ovate, white, sulcated, transversely clouded with brown, or yellow-orange; outer lip with internal dentations. An inch long. Inhabits the West Indian seas.

FAMILY III.—PURPURIFERA.

Shell with a short canal posteriorly ascending, or with

an oblique notch at the base of the aperture, directed backwards.

SUB-DIVISION 1.—Having an oblique notch directed backwards.

Genus 12.—TEREBRA.—*Lamarck.*

Generic Character.—Shell elongated, turreted, acuminated; aperture longitudinal, several times shorter than the spire, emarginate; base of the columella contorted and oblique.

Terebra vittata.—THE FILLETED TEREBRA. Plate XI. fig. 12. Pale fawn-coloured, smooth; body, and volutions transversely striated at the top, and with transverse purplish bands, occupying nearly its lower half. One inch long. Inhabits the Indian ocean.

Genus 13.—EBURNA.—*Lamarck.*

Generic Character.—Shell ovate or elongated; the outer lip simple; aperture longitudinal; emarginated at the base; columella umbilicated above, with a canal below the umbilicus.

The peculiar character of the umbilicus and of the columella, which is prolonged at the lower base and forms a canal occupying the remaining part of the left side, is a striking feature in this genus.

Eburna Zeylanica.—THE CEYLON EBURNA. Plate XI. fig. 13. Smooth, white, with irregular large yellowish-brown spots; apex acute, smooth, white; sutures distinct, canal of the columella scaly. Two and a half inches long. Inhabits the coasts of Ceylon.

Genus 14.—BUCCINUM.—*Linnæus.*

Generic Character.—Shell ovate, or ovato-conical; aperture longitudinal, with the base emarginate; no canal; columella not flattened, turgid above.

Sub-division.—NASSA. The shells have a callous columella.

Buccinum undatum.—THE WAVED BUCCINUM. Plate XI. fig. 14. Ovato-conical, ventricose; obliquely waved; grooved and striated transversely, longitudinally striulate; covered with a yellow olivaceous epidermis; volutions convex; aperture white or yellow. Four inches long. Inhabits the European seas.

Genus 15.—DOLIUM.—*D'Argenville.*

Generic Character.—Shell thin, ventricose, inflated; frequently subglobose, very rarely oblong; transversely ribbed; outer lip dentated or crenated; aperture longitudinal, emarginate at the base.

Dolium Perdix.—THE PARTRIDGE DOLIUM. Plate XI. fig. 15. Ovato-oblong, thin, reddish-brown, clouded and spotted with white; thickly ribbed and convex; spire short. Four inches long. Inhabits the Tropical seas.

Genus 16.—HARPA.—*Lamarck.*

Generic Character.—Shell ovate, more or less turgid; with longitudinal, parallel, compressed, inclined ribs; spire short; aperture longitudinal, emarginate below; no canal; columella smooth, flattened, and acute at the base.

Harpa rosea.—THE ROSEATE HARPA. Plate XI. fig. 16. Oblong-ovate, flesh-coloured, with roseate interrupted bands; ribs remote; columella of a fine rosy hue. Two inches long. Inhabits the Indian ocean.

Genus 17.—CONCHOLEPAS.—*Lamarck.*

Generic Character.—Shell ovate, inflated, semispiral; apex inclined obliquely towards the columellar lip; aperture very wide, longitudinal, oblique, provided with a notch beneath; outer lip with two teeth at its base; aperture furnished with an oblong, thin, horny operculum.

Concholepas Peruvianus.—THE PERUVIAN CONCHOLEPAS. Plate XI. fig. 17. Three inches long, and very thick, with

an umber-brown back, and white inside. Inhabits the coasts of Peru.

Genus 18.—MONOCEROS.—*Lamarck.*

Generic Character.—Shell ovate; aperture longitudinal, obliquely emarginate at the base; a conical tooth at the base of the outer lip.

Monoceros cingulatum.—THE BANDED MONOCEROS. Plate XI. fig. 18. Ovato-oblong, with raised spiral bands, and very minutely striated; the bands black; the whorls angular above; the aperture pure white. Inhabits the western coasts of Mexico.

Genus 19.—PURPURA.—*Lamarck.*

Generic Character.—Shell ovate, either smooth, or tubercular, or angular; aperture dilated, emarginate at the base, having a subcaniculate oblique sinus; columella depressed, ending below in a point.

Purpura Persica.—THE PERSIAN PURPURA. Plate XI. fig. 19. Transversely sulcate, and striated between the ridges; dark-burnt-umber brown; ridges cream-yellow, with distant spots of very dark umber brown; upper ridge and the superior edges of the volutions mucronate; inside sulcated and striated, white with yellow lines, the lip black. Inhabits the Indian seas.

Genus 20.—RICINULA.—*Lamarck.*

Generic Character.—Shell ovate, usually tubercular or spinous externally; aperture longitudinal, furnished with a short recurvate canal, terminated by an oblique notch; columella with unequal teeth; the teeth on the interior of the right lip frequently narrowing the aperture.

Ricinula horrida.—THE RUGGED RICINULA. Plate XI. fig. 20. External surface covered with strong, obtuse, black tubercles, the interstices being white and transversely striated; inside of both lips of a rich purple; outer lip with

five triangular, grooved rays, between which, at their base, the margin is crenulated. One and a half inch long. Inhabits the East Indian seas.

Genus 21.—CASSIS.—*Lamarck.*

Generic Character.—Shell gibbous; aperture longitudinal, narrow, terminating in a short canal, abruptly reflected backwards; columella transversely plicated or rugose; outer lip usually dentated.

The genus consists of two subdivisions: 1. Spire with longitudinal varices. 2. Spire without varices.

Cassis Areola.—THE PATCHED CASSIS. Plate XI. fig. 21. Smooth, shining, white, with square orange tesselated spots; spire short and conical, with decussated striæ; lower part of columella rugose. Two and a half inches long. Inhabits the Indian ocean.

Genus 22.—CASSIDARIA.—*Lamarck.*

Generic Character. — Shell obovate, or ovate-oblong; aperture longitudinal, narrow, terminating in an ascending curved canal; outer lip marginated, or folded back at the margin; inner lip covering the columella, generally rough, granular, tuberculate, or rugose.

Distinguished from Cassis by the canal being ascendent, and very little arched, and not suddenly recurved towards the back, as in that genus.

Cassidaria Thyrrena.—THE TYRRHENE CASSIDARIA. Plate XI. fig. 22. Ovate, transversely grooved, reddish fulvous; volutions convex; the last turn generally with one tuberculate groove; aperture white; columella rugosely tuberculate. Three inches and a half long. Inhabits the Mediterranean sea.

FAMILY IV.—ALATA.

Shell provided with a canal of greater or less extent, at the base of the aperture; the right lip changing its form as

the animal advances in age, and provided with a sinus at the lower part.

Genus 23.—STROMBUS.—*Linnæus.*

Generic Character.—Shell ventricose, base terminating in a short truncated, emarginated canal; right lip dilating with age into a simple, entire wing, lobed or crenulated above, and provided with a sinus beneath, separated at the base from the canal or notch; aperture provided with a long narrow horny operculum.

Strombus Auris-Dianæ.—DIANA'S EAR STROMBUS. Plate XI. fig. 23. Oblong-ovate; spire acute, tuberculated, and transversely striated; base recurved; outer lip thick; anterior lobe with a finger-like termination. Three inches and a quarter long. Inhabits the Indian ocean.

Genus 24.—PTEROCERA.—*Lamarck.*

Generic Character.—Shell oblong-ovate, ventricose, terminating in a lengthened canal; outer lip dilating with age into an expanded, rayed, or digitated wing, with a sinus near the base; spire short.

Pterocera Chiragra.—THE KNOTTY PTEROCERA. Plate XI. fig. 24. Ovate, tuberculated, with six digitated, canaliculated rays, which are closed over in the adult shell; outer lip internally striated. Six inches and a half long, exclusive of the digitated lobes. Inhabits the Indian ocean.

Genus 25.—ROSTELLARIA.—*Lamarck.*

Generic Character.—Shell fusiform or sub-turreted, terminated below by a beaked canal; outer lip entire in some species, and dentated in others, more or less dilated by age; with a sinus near the canal.

Rostellaria Pes-pelecani.—THE PELICAN'S FOOT ROSTELLARIA. Plate XI. fig. 25. Turreted, flesh-coloured or white; body and volutions longitudinally ribbed, and crowned with papillæ; base of body papillose; outer lip palmate,

with three acute, divaricate digitations. One inch and a half long. Inhabits the European seas.

FAMILY V.—CANALIFERA.

Shell with a canal of greater or less length, situated at the base of the aperture; the outer lip differing little in the young and adult states.

SUB-DIVISION I.—Having a permanent varix on the outer lip, and varices on the spire.

Genus 26.—TRITON.—*Lamarck.*

Generic Character.—Shell ovate or oblong, with a canaliculated base having alternate or nearly solitary varices, which never form longitudinal continuous ridges; aperture oblong, provided with an operculum.

The varices in this genus are not in continuous rows from the apex to the base as in Murex and Ranella, but in interrupted alternating series.

Triton variegatum.—THE VARIEGATED TRITON. Plate XI. fig 26. Elongated, conical, trumpet-shaped; suture of the spire crenulated pillar lip grooved obliquely; pale purple, elegantly clouded and spotted with brown. Sixteen inches long. Inhabits the Indian and American seas.

Genus 27.—MUREX.—*Linnæus.*

Generic Character.—Shell ovate or oblong, with a canaliculated base furnished with rough spinous or tuberculated varices, on each volution of the spire, the lower ones uniting with those above, so as to form continuous rows; aperture with a corneous operculum.

The Shells of this genus are easily distinguished by their having three or more rows of varices on each whorl; while the Ranellæ have only two, and the Struthiolariæ but one, and that situated on the margin.

SECTION * Shells with a slender beak, always longer than the aperture.

——** Beak thickened, not abrupt, and more or less lengthened.

† Volutions with three varices.

† † Volutions with more than three varices.

Murex spiralis.—THE SPIRAL MUREX. Plate XI. fig. 27. Body roundish; separated from the spire by a narrow ridge; spire depressed; upper volutions rounded, and terminating in an obtuse apex; canal very long and curved; flesh-coloured, substriated, with remote brown irregular spots. Three inches long. Inhabits the Chinese seas.

Genus 28.—RANELLA.—*Lamarck.*

Generic Character.—Shell oval or oblong; sub-depressed with two opposite continuous varices, and canaliculated at the base; aperture rounded or ovate; varices straight or oblique, situated at intervals of half a volution, forming a continuous longitudinal row on each side.

Ranella spinosa.—THE PRICKLY RANELLA. Plate XII. fig. 1. Ovate, depressed, with acute, short, distinct, muricated tubercles; fawn-coloured; varices lateral, with elongated spines; beak sulcated; outer lip internally crenated. Two inches and an eighth long. Inhabits the Indian ocean.

Genus 29.—STRUTHIOLARIA.—*Lamarck.*

Generic Character.—Shell ovate; spire produced; aperture oval, with a sinus, terminated at the base by a very short, straight canal without any notch; pillar lip callous, spreading; margin of outer lip sinuous, with an exterior ridge.

Struthiolaria nodulosa.—THE NODULOUS STRUTHIOLARIA. Plate XII. fig. 2. Ovate, grooved, and striated transversely; top of volutions flattened and nodulous; cream-yellow, with undulated brownish-yellow longitudinal lines; lip yellow-orange within. Three inches long. Inhabits New Zealand.

SUB-DIVISION II. — Without a constant ridge on the outer-lip.

Genus 30.—PYRULA.—*Lamarck.*

Generic Character. — Shell sub-pyriform; base with a canal, ventricose above, destitute of external ridges; spire short, sometimes obtuse; columella smooth; outer lip without a notch.

Pyrula ficus.—THE FIG PYRULA. Plate XII. fig. 3. Spire very short; volutions rounded above; yellow-brown, spotted with dark brown; and covered with decussated striæ. Three inches long. Inhabits the Indian ocean.

Genus 31.—FUSUS.—*Lamarck.*

Generic Character.—Shell fusiform or sub-fusiform, with a canal at the base; middle or lower part ventricose, without varices; spire produced; margin of the outer lip without a notch; columella smooth; aperture oval, with a horny operculum.

Fusus corneus.—THE HORNY FUSUS. Plate XII. fig. 5. Elongated, with eight convex volutions, striated spirally, and covered by an olivaceous epidermis; beak long, oblique. Three inches long. Inhabits the seas of Northern Europe.

Genus 32.—FASCIOLARIA.—*Lamarck.*

Generic Character.—Shell sub-fusiform, with a canal at its base; without varices; columella with two or three oblique plaits.

Fascioluria Trapezium.—THE QUADRANGULAR FASCIOLARIA. Plate XII. fig. 6. Ventricose, obtusely angled; volutions nodulous; reddish fawn-coloured, with transverse, double, slightly undulated lines; inside of aperture with reddish striæ. Six inches long. Inhabits the Indian ocean.

Genus 33.—CANCELLARIA.—*Lamarck.*

Generic Character.—Shell oval or turreted; base of the aperture sub-canaliculated; canal very short, almost none;

columella plicate, the plaits varying in number; usually transverse; lip internally furrowed.

Cancellaria reticulata. — THE RETICULATED CANCELLARIA. Plate XII. fig. 4. Oval, strong, ventricose, with distant, coarse, reticulated striæ; sometimes with yellow or orange bands; pillar with three plaits; aperture white. Two inches long. Inhabits the Atlantic ocean.

Genus 34.—TURBINELLA.—*Lamarck.*

Generic Character.—Shell turbinated or sub-fusiform; with a canal at the base; columella with from three to five oblique, transverse, and compressed plaits.

Somewhat allied to both Murex and Voluta, but differing from the former in the want of varices, and from the latter, in having no canal; although also somewhat like Fasciolaria, it can be distinguished from that genus by the position of the plaits on the columella.

Turbinella Pyrum.—THE PEAR-SHAPED TURBINELLA. Plate XII. fig. 8. Pear-shaped; yellowish-white, with irregular reddish-brown spots; spire short, mucronate; apex mammilliform; beak long; columella with four plaits; in adult specimens, the shell is covered with a very thick opaque yellow-brown epidermis. Six inches long. Inhabits the Indian ocean.

Genus 35.—PLEUROTOMA.—*Lamarck.*

Generic Character.—Shell turreted or fusiform, terminated below by a straight canal, of greater or less length; outer-lip with a notch or fissure at the upper part; aperture with a small horny operculum.

Pleurotoma nodifera. — THE JAVANESE PLEUROTOMA. Plate XII. fig. 7. Fusiform, turreted; volutions somewhat angulated, upper ones smooth; under volutions and body transversely striated with angulated oblique nodules at the suture; outer lip deeply crenulated, with a large notch; reddish-yellow. One inch and a half long. Inhabits the seas around Java.

Genus 36.—CERITHIUM.—*Bruguiere.*

Generic Character.—Shell turreted; aperture oblong, oblique, terminated at the base by a short, truncated, recurved canal, without a notch; the outer lip with a groove at its upper extremity; aperture provided with a small horny operculum.

This genus is allied to Pleurotoma, but the aperture is without the slit on the right margin.

Cerithium semigranosum.—THE SEMIGRANULATED CERITHIUM. Plate XII. fig. 9. Fusiform, turreted apex acute; transverse minute striæ, and sulcated granulations; the suture with double spiral rows of large granules colour reddish-brown. One inch and a half long. Inhabits the seas of New Holland.

SECTION II.—PHYTIPHAGA.

Without a projecting siphon, generally respiring by an orifice; provided with jaws, and usually feeding on vegetable substances; shell having the aperture entire, and destitute of a notch or canal.

FAMILY I.—TURBINACEA.

Shell turreted, or conical, with an oblong or rounded aperture, not expanding, and the margin disunited.

Genus 37.—TURRITELLA.—*Lamarck.*

Generic Character.—Shell turreted, not pearly; aperture rounded, entire margin disunited above; the outer lip with a slight sinus, and the aperture furnished with a horny operculum.

The genera Scalaria, Turbo, and Cerithium, are nearly allied to this genus, but may easily be distinguished from them by a sinus on the right margin of the aperture, which is only visible when the mouth is quite perfect, and which does not exist in any other shells.

Turritella Terebra.—THE AUGER TURRITELLA. Plate XII. fig. 11. Greatly turreted, with acute, spiral striæ; yellowish-brown or whitish; apex usually reddish. Two inches long. Inhabits the European seas.

Genus 38.—PHASIANELLA.—*Lamarck.*

Generic Character.—Shell ovate or conical, solid; aperture entire; longitudinally ovate; the lips disunited above; the outer sharp-edged, but not reflected; columella smooth, compressed, and attenuated at the base; aperture provided with a calcareous or horny operculum.

Mr. Swainson has pointed out a highly distinctive character in the shells of this genus, namely, that of a slightly projecting or salient angle, running along the columella.

Phasianella Pullus.—THE CHICKEN PHASIANELLA. Plate XII. fig. 12. Smooth, glossy; volutions inflated; skin-coloured, with spots of crimson or rich reddish-brown. One quarter of an inch long. Inhabits the coasts of Britain.

This species however is not characteristic, and has even been referred to a different genus. The finest species belong to New Holland.

Genus 39.—PLANAXIS.—*Lamarck.*

Generic Character.—Shell ovate or conic, solid; aperture ovate, or somewhat elongated; columella depressed and truncated at the base, separated from the outer lip by a compressed sinus; lip interiorly sulcated, having a callosity running under the superior portion.

Somewhat allied to the genus Phasianella, but distinguished by the base of the columella being truncated as in the genus Melanopsis.

Planaxis sulcata.—THE FURROWED PLANAXIS. Plate XII. fig. 16. Imperforate, transversely furrowed; grayish-white, and spotted with black, forming oblique longitudinal fasciæ; outer lip internally crenulated and striated. One inch long. Inhabits the American seas.

Genus 40.—TURBO.—*Linnæus.*

Generic Character.—Shell conoid, or sub-turriculated; aperture entire, round, margin of outer lip disunited; columella arcuated, depressed, but not truncated at the base; aperture provided with a testaceous operculum.

This genus has recently been subdivided into a great number of genera, one of which contains our common Periwinkle, Littorina littorea.

Turbo setosus.—THE BRISTLY TURBO. Plate XII. fig. 17. Thick, transversely and deeply sulcated, and longitudinally striated; spire short; volutions rounded; lip crenulated; variegated with white, green, and brown; inside perlaceous. Two inches long. Inhabits the Indian seas.

Genus 41.—MONODONTA.—*Lamarck.*

Generic Character.—Shell ovate or conoid; aperture round and entire; outer lip disunited from the body at top; columella arcuated and truncated at the base; aperture provided with an operculum.

Monodonta coronaria.—THE THICK-LIPPED MONODONTA. Plate XII. fig. 10. Covered with numerous, small, scabrous, acute, turbercles; outer lip very thick; apex blunt, white; the columella reddish. One inch and a quarter long. Inhabits the Chinese seas.

Genus 42.—TROCHUS.—*Linnæus.*

Generic Character.—Shell conical; spire elevated, sometimes abbreviated; aperture transversely depressed; margin of outer lip disunited from the body at the upper part; columella arcuated, more or less oblique at the base; aperture provided with a horny operculum.

Trochus Zizyphinus.—THE ZIZYPHINE TROCHUS. Plate XII. fig. 2. With strong transverse striæ; colour livid,

with undulated streaks of reddish flesh-colour, or brownish carnation. One inch long. Inhabits the European seas.

Genus 43.—ROTELLA.—*Lamarck.*

Generic Character.—Shell orbicular, glossy, destitute of epidermis; spire short, subconic; lower parts convex and callous; aperture half round.

Rotella vestiaria.—THE ORNAMENTAL ROTELLA. Plate XII. fig. 18. Pale skin-coloured, or citron-coloured, the upper part of body and spire spotted with dark brown. Half an inch long. Inhabits the Indian ocean.

Genus 44.—SOLARIUM.—*Lamarck.*

Generic Character.—Shell orbicular, in the form of a depressed cone; largely umbilicated; internal margins of the volutions, which are visible in the umbilicus, crenulated; aperture wide; mouth quadrangular, destitute of a columella.

Solarium perspectivum.—THE PERSPECTIVE SOLARIUM. Plate XII. fig. 23. Cream-yellow, with brown or chestnut and white bands near the sutures of the volutions; umbilicus ample, and crenulated. Two and a half inches broad. Inhabits the Indian ocean.

FAMILY II.—SCALARIDEA.

Shell devoid of plaits or folds on the columella; margins of the aperture united in a circular form.

Genus 45.—DELPHINULA.—*Lamarck.*

Generic Character.—Shell subdiscoid or conical, umbilicated, solid; volutions of the spire rough or angular; aperture entire, round, sometimes trigonal, with the edges united, and generally provided with a fringe, or a thick marginal ridge; spire depressed.

Delphinula laciniata. — THE FRINGED DELPHINULA. Plate XII. fig. 22. Umbilicus large, surrounded by large

vaulted scales, in spiral rows; also with strong waved spiral striæ; brownish-red, variegated with white. Two inches long. Inhabits the Indian seas.

Genus 46.—SCALARIA.—*Lamarck.*

Generic Character.—Shell subturreted, with longitudinal, elevated, thin, interrupted ribs; aperture rounded; margins united in a circle, and edged by a reflected ridge.

Scalaria pretiosa. — THE WENTLETRAP, or PRECIOUS SCALARIA. Plate XII. fig. 20. Conical, smooth, cream-yellow; volutions disjoined, connected by longitudinal ribs; body extremely ventricose; a deep umbilicus. One and a half inch long. Inhabits the Indian ocean.

Genus 47.—VERMETUS.—*Lamarck.*

Generic Character.—Shell thin, tubular, loosely spiral in the lower part, the three or four upper volutions regularly spiral; attached to other substances by the apex of the spire; aperture orbicular, margins united, and provided with an operculum.

These shells are remarkable on account of their adhering or being affixed to marine bodies by the attenuated and pointed extremity of the spire.

Vermetus lumbricalis. — THE WORM-LIKE VERMETUS. Plate XII. fig. 24. Variously twisted; reddish-brown, sometimes clouded with darker brown. Two to four inches long. Inhabits the African seas.

FAMILY III.—PLICACEA.

Shell with the aperture somewhat contracted, and the columella plaited.

Genus 48.—PYRAMIDELLA.—*Lamarck.*

Generic Character.—Shell turreted, destitute of epidermis; aperture entire, semi-ovate, the outer lip with a sharp

edge; columella produced at the base, subperforated, and provided with three transverse plaits.

Pyramidella Terebellum.—THE WIMBLE PYRAMIDELLA. Plate XII. fig. 26. Smooth, glossy, white, with reddish-brown fasciæ; columella recurved; inside of the lip smooth. One and one-fourth inch long. Inhabits the American seas.

Genus 49.—TORNATELLA.—*Lamarck.*

Generic Character.—Shell convolute, ovate-cylindrical, usually transversely striated, and destitute of epidermis; aperture oblong, entire, with the margin of the outer lip thin; one or several folds at the base of the columella.

Tornatella fasciata.—THE BANDED TORNATELLA. Plate XII. fig. 27. Covered with fine transverse striæ; spire produced, apex acute; aperture straitened, columella with one plait; purplish-red, with two white transverse fasciæ. Inhabits the coast of Britain.

FAMILY IV.—MACROSTOMA.

Shell ear-shaped, with the aperture very wide, and the margins disunited; without any columella or operculum.

Genus 50.—HALIOTIS.—*Linnæus.*

Generic Character.—Shell ear-shaped, usually depressed; spire short, sometimes depressed, and nearly lateral; aperture extremely large, oblong-ovate, and entire in the adult state; disk perforated with holes, disposed in a line parallel to the left margin, which commences by a notch.

Haliotis asinina.—THE ASININE HALIOTIS. Plate XII. fig. 28. Shell elongated, narrowish, somewhat curved, smoothish, green, marbled with brown; pearly and iridescent within; marked with oblique undulated striæ, and having the spire very short. Two and a half inches long. Inhabits the seas of China and the Moluccas.

Genus 51.—STOMATIA.—*Lamarck.*

Generic Character.—Shell ear-shaped, imperforate; spire prominent; aperture entire, oblong, and large; outer lip elevated as much as the pillar; back with a transverse subcarinated tuberculated rib.

Stomatia phymotis.—THE TUMOURED STOMATIA. Plate XII. fig. 29. Ovate oblong; back convex, striated, nodulous, and white; spire small, contorted; lip thin and acute. Three and a fourth inches long. Inhabits the Indian ocean.

Genus 52.—STOMATELLA.—*Lamarck.*

Generic Character.—Shell orbicular or oblong, ear-shaped, imperforate; aperture entire, large, elongated; outer lip effuse, dilated, and open.

This shell is distinguished from Stomatia, by its never having the transverse rib of the species of that genus.

Stomatella imbricata.—THE IMBRICATED STOMATELLA. Plate XII. fig. 30. Suborbicular, convex, somewhat depressed, rough, having thick-set transverse ribs, covered with imbricated scales; grayish-brown. More than an inch and a half long. Inhabits the Indian ocean.

Genus 53.—SIGARETUS.—*Lamarck.*

Generic Character. — Shell subauriform, suborbicular; outer lip short and spirally intorted; aperture entire, very expanded, ovate oblong; the margins disunited.

Sigaretus somewhat approximates the genus Natica, and much resembles a depressed shell of that genus, from which, however, the extraordinary width of the aperture, and its spiral short columella render it quite distinct.

Sigaretus concavus.—THE CONCAVE SIGARETUS. Plate XII. fig. 25. Ovate, back convex, covered with transverse undulated striæ; reddish-yellow, spire white, somewhat prominent; aperture expanded, concave; umbilicus deepish. Inhabits the Indian ocean.

FAMILY V.—IANTHINEA.

Shell not floating, having the aperture very wide; no columella.

Genus 54.—IANTHINA.—*Lamarck.*

Generic Character.—Shell ventricose, somewhat conical, thin, and pellucid; aperture triangular; columella straight, produced beyond the base of the outer lip, which has a sinus in the middle aperture without an operculum.

Ianthina communis.—THE COMMON IANTHINA. Plate XII. fig. 19. Extremely fragile, of a beautiful violet hue; aperture triangular, with a small notch on the margin of the outer lip. One inch long. Inhabits the Atlantic and Mediterranean.

FAMILY VI.—NERITACEA.

The shells are both marine and fluviatile; semiglobular or oval; destitute of a columella, with the aperture edged and transverse, and provided with an operculum.

Genus 55.—NATICA.—*Adanson.*

Generic Character.—Shell subglobose, umbilicated; aperture entire, and half rounded; inner lip oblique, without teeth; but having a callosity, which partly covers the umbilicus, and in some species entirely conceals it; outer lip sharp, smooth within; aperture provided with an operculum.

Natica Canrena.—THE CANRENE NATICA. Plate XII. fig. 15. Subglobular, smooth; fawn-coloured, with bands and interrupted rays of reddish-brown, and zigzag lines and streaks; base of body and inner lip white, deeply umbilicated; spire a little prominent. One inch and three-fourths long. Inhabits the West Indian ocean.

Genus 56.—NERITA.—*Lamarck.*

Generic Character.—Shell solid, semiglobose, flattened below, without an umbilicus; aperture semi-orbicular and entire; inner lip depressed, septiform, thin-edged, and frequently dentated or crenated; outer lip obtuse, and often provided internally with teeth.

Nerita peloronta.—THE BLOODY-TOOTH NERITA. Plate XII. fig. 13. Thick, transversely sulcated; gray or reddish-yellow, with variously coloured bands; inner lip with two teeth or crenulations, having a bloody mark at their base. One inch long. Inhabits the seas of South America and the West Indies.

Genus 57.—NERITOIDES.—*Brown.*

Generic Character.—Shell strong, thick, subrotund; spire depressed; aperture nearly round; lip almost continuous, having a slight groove only at its junction with the body; no umbilicus.

Neritoides litoralis.—THE SHORE NERITOIDES. Plate XIII. fig. 24. Smooth, covered with an olive-green, yellow, brown, or otherwise coloured epidermis, sometimes beautifully banded or chequered beneath it; inside generally purplish-brown; body very large; spire very short and depressed. Five-eighths of an inch long. Inhabits the shores of Northern Europe.

This shell is the Turbo neritoides, and Turbo retusus of Lamarck.

Genus 58.—NERITINA.—*Lamarck.*

Generic Character.—Shell rather thin, semiglobose, or ovate, flattened below; without an umbilicus; aperture semicircular; inner lip flattened, and reflected on the columella, sometimes slightly crenated; outer lip destitute of teeth or crenulations on its internal face; aperture provided with an operculum, having a lateral point.

Neritina fluviatilis. — THE FRESH-WATER NERITINA.

Plate XII. fig. 14. Shell small, oval; back convex, smooth, white, variously speckled with red, black, or dark brown; spire inclined, lateral; lip slightly denticulate. One-third of an inch long. Inhabits the rivers and streams of Europe.

Genus 59.—NAVICELLA.—*Lamarck.*

Generic Character.—Shell elliptical or oblong, convex above, concave beneath; spire lowered to the margin; inner lip flattened, acute, narrow, and destitute of teeth; aperture provided with a solid flat operculum, having a lateral acute point.

Navicella elliptica. — THE OVAL NAVICELLA. Plate XIII. fig. 1. Smooth, shining, spotted and streaked with purple, blue, or brown; covered with an olivaceous epidermis; spire curved, prominent, extending beyond the margin. One inch long. Inhabits rivers in the Isle of France, India, and the Moluccas.

FAMILY VII.—PERISTOMIDA.

Shell conoid or subdiscoid, with the margins of the aperture united; aperture protected by an operculum; fluviatile, and the animal respiring water.

Genus 60.—AMPULLARIA.—*Lamarck.*

Generic Character.—Shell globular, ventricose, umbilicated; inner lip without a callosity; aperture oblong, entire; margins united; outer lip acute, but not reflected; an operculum.

Ampullaria Guyanensis.—THE GUIANA AMPULLARIA. Plate XII. fig. 2. Globular, thick, with unequal longitudinal striæ; covered with a fuscous-brown epidermis; inside golden-yellow. Three inches in diameter. Inhabits the rivers of Guiana.

Genus 61.—PALUDINA.—*Lamarck.*

Generic Character.—Shell conoid; volutions rounded or

convex, modifying the spiral cavity; aperture subrotund, ovate, or oblong, angulated above; margins of outer and inner lips united, acute, but not reflected; an orbicular horny operculum.

Paludina vivipara.—THE VIVIPAROUS PALUDINA. Plate XIII. fig. 3. Thin, ovate, ventricose, wrinkled longitudinally; body with three or four brown bands; covered with an olivaceous epidermis. One inch and a half long. Inhabits the rivers of Europe.

Genus 62.—VALVATA.—*Muller.*

Generic Character.—Shell discoid or conoid, umbilicated; volutions cylindrical, not modifying the spiral cavity; margins united and acute; operculum orbicular.

Valvata piscinalis.—THE POND VALVATA. Plate XIII. fig. 4. Globular, conoid, somewhat trochus-shaped, deeply umbilicated; apex obtuse; longitudinally wrinkled; covered with a greenish-yellow epidermis. One-fourth of an inch long. Inhabits the rivers and lakes of Europe.

FAMILY VIII.—MELANIACEA.

Fluviatile, operculated shells; with the margins of the aperture disunited; the outer lip always thin-edged; the animals respire water only, and are provided with two tentacula.

Genus 63.—PIRENA.—*Lamarck.*

Generic Character.—Shell turreted; aperture longitudinal; outer lip acute, with a distinct sinus at the base, and another at its junction with the body; base of the columella turned towards the right; a horny operculum.

Pirena terebralis.—THE WIMBLE PIRENA. Plate XIII. fig. 7. Subulate, longitudinally striated; outer lip expanded; covered with a deep blackish-brown epidermis; aperture white. Three inches long. Inhabits the rivers of India.

Genus 64.—MELANOPSIS.—*Lamarck.*

Generic Character. — Shell turreted; aperture ovato-oblong, entire; columella with a callosity above, truncated at the base and incurvated; the outer lip separated from the inner by a sinus; aperture with a horny operculum.

Melanopsis is distinguished from Melania, by the columella being callous at the upper part, and the base truncated as in Achatina; it differs from Pirena in having only one sinus, or a widened opening at the base of the shell.

Melanopsis lævigata. — THE POLISHED MELANOPSIS. Plate XIII. fig. 28. Ovate, conical, smooth, of a chestnut colour. Three-fourths of an inch long. Inhabits the rivers of the Archipelago.

Genus 65.—MELANIA.—*Lamarck.*

Generic Character. — Shell turreted; aperture entire, ovate or oblong, effuse at the base; columella smooth, and incurvated; a horny operculum.

Melania amarula. — THE CROWNED MELANIA. Plate XIII. fig. 8. Ovate-oblong, thick; longitudinally wrinkled; transversely striated at the base of the body; upper margin of the volutions crowned with triangular tubercles, from which emanate straight slender spines; colour deep chestnut, covered with a black epidermis; aperture bluish-white. One and a half inch long. Inhabits the rivers of India.

FAMILY IX.—LYMNÆACEA.

Animals amphibious, usually without an operculum; and having flattened tentacula; shell spiral, generally smooth on the external surface; the margin of the outer lip is always acute, and not reflected. They live in fresh water, but come to the surface to respire.

Genus 66.—LYMNÆA.—*Bruguiere.*

Generic Character.—Shell oblong, sometimes turreted,

with the spire produced; aperture entire, oblong; the outer lip acute; the lower part of the outer lip rising on the columella, and there forming an oblique plait, which enters into the aperture; destitute of an operculum.

Lymnæa stagnalis.—THE POND LYMNÆA. Plate XIII. fig. 9. Ovato-acuminate, with the last turn ventricose, and subangulate above; the spire tapering to a point; the aperture large; the outer lip spreading, thin, transparent, and horn-coloured. Two inches long. Inhabits the ditches and ponds of Europe.

Genus 67.—PHYSA.—*Drapernaud.*

Generic Character.—Shell generally sinistral, convolute, oval, or oblong; spire prominent; aperture longitudinal, contracted above; columella twisted; outer lip very thin, acute, partly obtruding above the plane of the opening; destitute of an operculum.

Physa fontinalis.—THE FOUNTAIN PHYSA. Plate XIII. fig. 6. Volutions reversed, oval, diaphanous, glossy, horn-coloured; spire very short and rather acute. Half an inch long. Inhabits the ditches and streams of Europe.

Genus 68.—LUTEA.—*Brown.*

Generic Character.—Shell globular; spire short, subacute; aperture ovate; outer lip not continuous, slightly inflected at the top, and acute at the base; a little reflected on the base of the columella, and subumbilicated.

Lutea lacuna.—THE LAKE LUTEA. Plate XIII. fig. 10. Very diaphanous, slightly wrinkled, and of a greenish horn-colour. Half an inch long. Inhabits ditches in Britain.

Genus 69.—PLANORBIS.—*Lamarck.*

Generic Character.—Shell discoid; spire depressed or flat; the volutions apparent on both sides; aperture oblong, semilunar, very distant from the axis of the shell; margin not reflected; no operculum.

Planorbis carinatus.—THE KEELED PLANORBIS. Plate XIII. fig. 11. Depressed; upper side concave, with a keel round the middle of the last volution. Three-fourths of an inch in diameter. Inhabits the ditches and lakes of Europe.

Genus 70.—PLANARIA.—*Brown.*

Generic Character.—Shell discoid, depressed on both sides; the volutions conspicuous on either side; spire slightly produced above, and concave beneath; aperture ovate; edges of outer lip acute; no operculum.

Planaria alba.—THE WHITE PLANARIA. Plate XIII. fig. 17. White, slightly wrinkled transversely; outer lip with a narrow margin behind. One-fourth of an inch in diameter. Inhabits the coast of Dunbar, Scotland.

FAMILY X.—COLIMACEA.

Shell spiral, but without any exterior projections, except the additions of growth; outer lip frequently reflected; tentacula of the animal cylindrical; no operculum. Terrestrial.

SECTION I.—Animals with two tentacula.

Genus 71.—CYCLOSTOMA.—*Lamarck.*

Generic Character.—Shell variable in shape; volutions rounded; aperture circular, entire, and reflected in the adult state; a horny operculum.

Cyclostoma elegans.—THE ELEGANT CYCLOSTOMA. Plate XIII. fig. 12. Ovate, conical, umbilicated; with elegant transverse striæ; volutions five, very convex; ash-coloured, with three bands of brown spots. Half an inch long. Inhabits Europe.

Genus 72.—AURICULA.—*Lamarck.*

Generic Character.—Shell suboval, or ovato-oblong; aperture longitudinal; entire at the base and contracted

above, or with the margins disunited; columella with one or more plaits; outer lip sometimes reflected, and in other species simple.

SECTION * Right lip outwardly reflected.
** Right lip plain and sharp.

Auricula Judæ.—JUDAS' AURICULA. Plate XIII. fig. 13. Oblong, conical, cylindrical, thick, with minute decussated striæ and granulations; whitish-brown; columella with three plaits; aperture contracted in the middle. Two and a fourth inches long. Inhabits the East Indies.

SECTION II.—Animals with four tentacula.

Genus 73.—SUCCINEA.—*Draparnaud.*

Generic Character.—Shell ovate, or ovato-conical; aperture very wide, entire, and longitudinal; outer lip acute, but not reflected, united below to the columella, which is smooth and thin-edged; no operculum.

The shells of this genus never have their lip reflected or thickened, and are thus distinguished from those of the genus Bulimus, to which they bear a strong resemblance.

Succinea amphibia.—THE AMPHIBIOUS SUCCINEA. Plate XIII. fig. 14. Amber-coloured; excessively thin and pellucid; spire short; aperture expanded beneath, nearly vertical. Three-fourths of an inch long. Inhabits the sides of ditches and lakes in Europe.

Genus 74.—ACHATINA.—*Lamarck.*

Generic Character.—Shell ovate or oblong; aperture entire, elongated; outer lip acute, never reflected; columella smooth, with its base truncated.

Achatina virginea. — THE VIRGIN ACHATINA. Plate XIII. fig. 15. Smooth, grayish-white, with red and black transverse bands; the columella with one plait, rose-coloured; volutions ventricose; inside of the lip bluish. One and a half inch long. Inhabits South America and the West Indies.

Genus 75.—BULIMUS.—*Lamarck.*

Generic Character.—Shell ovate, oblong, or turreted; aperture entire, longitudinal; margins very unequal, and disunited above; columella straight, smooth, entire at the base, and not effuse.

Bulimus montanus.—THE MOUNTAIN BULIMUS. Plate XIII. fig. 16. Ovate-oblong, umbilicated, slightly striated longitudinally; of a brownish horn-colour; with seven convex volutions; aperture semi-oval; outer lip white and reflected. Five-eighths of an inch long. Inhabits mountainous situations in Savoy, and other parts of Europe.

Genus 76.—CLAUSILIA.—*Lamarck.*

Generic Character.—Shell sinistral, generally fusiform, slender; summit somewhat obtuse; aperture irregular, rounded, oval; margins united, free, and externally reflected.

Clausilia papillaris.—THE PIMPLED CLAUSILIA. Plate XIII. fig. 18. Pellucid, finely striated longitudinally, horn-coloured brown; the margins of the volutions papillose; aperture with two plaits. Three-fourths of an inch long. Inhabits dry situations in Europe.

Genus 77.—PUPA.—*Lamarck.*

Generic Character.—Shell cylindrical, generally thick; aperture irregular, semi-ovate, rounded, and subangulated beneath; margins nearly equal, reflected outwards, unconnected at their upper parts; the plait of the columella interposed between them.

Pupa muscorum.—THE MOSS PUPA. Plate XIII. fig. 21. Very small, cylindrical, obtuse, and smooth, brownish horn-coloured; volutions convex; sutures much sunk; aperture with one tooth; outer lip white and reflected. One-eighth of an inch long. Inhabits moss, generally in shaded places, in Britain, France, and other countries of Europe.

Genus 78.—HELICINA.—*Lamarck.*

Generic Character.—Shell subglobose, imperforate; aperture entire, and semi-oval; columella callous, transverse, flattened, and forming an angle at the base of the outer lip; a horny operculum.

The shells of this genus are distinguished from the Helices, by their transverse callous columella, depressed and diminished in thickness at the lower part.

Helicina major.—THE GREAT HELICINA. Plate XIII. fig. 22. Citron-coloured, inside pink; pillar and outer lip white; the former broadly reflected on the columella.

Genus 79.—ANASTOMA.—*Lamarck.*

Generic Character.—Shell suborbicular; spire convex and obtuse; aperture rounded, dentated within, turned upwards and grinning; margin of the outer lip reflected.

Anastoma globulosa.—THE GLOBULAR ANASTOMA. Plate XIII. fig. 25. Suborbicular, obsoletely carinated, smooth, and white; aperture with six teeth; reddish-brown.

Genus 80.—CAROCOLLA.—*Lamarck.*

Generic Character.—Shell orbicular, more or less convex or conoid above, with the circumference acutely angulated; aperture transverse, contiguous to the axis of the shell; outer lip subangular, frequently dentated below.

Carocolla lapicida.—THE STONE-CUTTING CAROCOLLA. Plate XIII. fig. 26. Depressed above, convex beneath, broadly umbilicated, and transversely striated; reddish horn-coloured; body-volution carinated. Seven-eighths of an inch in breadth. Inhabits dry situations in Europe.

Genus 81.—HELIX.—*Linnæus.*

Generic Character.—Shell orbicular, convex or conoid above; sometimes globular, with the spire somewhat elevated; aperture entire, transverse, very oblique, contiguous

to the axis of the shell; having the margins disunited by the projection of the last volution. The Helices, or Snails, which are very numerous, and present considerable differences in the form of the shell, have by several more recent authors been arranged into various subgenera.

Helix arbustorum.—THE GROVE HELIX. Plate XIII. fig. 27. Subglobular, subumbilicated, finely striated longitudinally; greenish-yellow or reddish, beautifully mottled, and streaked with reddish-brown, and a broad brown band running throughout the middle of the volutions. One inch in diameter. Inhabits the thickets and woods of Europe.

ORDER IV.—GASTEROPODA.

Animals with straight bodies, and never spiral, nor enveloped entirely in a shell, having a foot or muscular disk under the abdomen, attached to the body nearly its whole length, and serving for progressive motion.

SECTION I.—PNEUMOBRANCHIÆ.

Branchiæ constructed like a vascular net, on the wall of a particular cavity, opening by a perforation which the animal has the power of contracting and dilating at pleasure. They respire air.

TRIBE I.—LIMACINEA.

The animals almost wholly naked, with elongated bodies; and creeping by means of a ventral disk; branchiæ in the form of a vascular network, lining a cavity, of which the aperture is a hole capable of being contracted or dilated at will.

Genus 1.—VITRINA.—*Lamarck.*

Generic Character.—Body creeping, elongated, snail-shaped, nearly straight; posteriorly separated from the foot,

and spirally bent; posterior appendages of the mantle displayed over part of the shell; four tentacula; the anterior very short. Shell small, extremely thin, depressed, spire very short; body very large; aperture ample, rounded, and oval; the left margin slightly inflected.

Vitrina pellucida. — THE PELLUCID VITRINA. Plate XIII. fig. 5. Extremely thin, pellucid, and glossy; depressed, with the spire very short; of a pale yellowish green; aperture large and oval. Four lines long. Inhabits dry places of Europe.

Genus 2.—TESTACELLA.—*Lamarck.*

Generic Character. — Body creeping, elongated, snail-shaped, having a shell on the posterior extremity; four tentacula, the two longest with the eyes at their tips; vent and respiratory aperture behind. Shell very small, external, somewhat ear-shaped; the apex obsoletely spiral; aperture very large, oval, with outer lip inflected.

Testacella haliotidea. — THE HALIOTIS-SHAPED TESTACELLA. Plate XIII. fig. 23. Shell oblong-ovate, auriform; left margin slightly reflected; exceedingly thin, transparent, and yellowish. Inhabits the middle provinces of France.

Genus 3.—LIMAX.—*Linnæus.*

Generic Character.—Body oblong, naked, and creeping; back convex, provided with a coriaceous slightly wrinkled shield; and having a flat longitudinal disk beneath; tentacula four, retractile, the two posterior the largest, with eyes at their tips; branchial cavity placed under the shield; orifice for respiration and vent on the right side. Shell very small, internal, extremely thin, oblong, ovate, flattened.

Limax rufus.—THE RED LIMAX. Plate XIII. fig. 29. Shell ovate-oblong, both margins reflected; very thin, diaphanous, slightly wrinkled, and of a pale straw-yellow colour; animal with the body longitudinally sulcate, red

above, white beneath. Inhabits gardens in Britain and France.

Genus 4.—PARMACELLA.—*Lamarck.*

Generic Character.—Body creeping, oblong; middle of the back moderately convex, and shield-shaped; the hind part in the form of a tail, laterally compressed, and acute above; shield ovate, fleshy, adhering at its posterior part, and free before, enveloping a shell, and having a notch in the centre of its right margin; four tentacula, the two posterior the largest; respiratory and anal orifices under the notch of the shield, and the orifice for generation placed between the two tentacula of the right side.

Parmacella calyculata. — THE CUP-SHAPED PARMACELLA. Plate XIII. fig. 31. Ovate; left margin broad and reflected, right margin reflected at top and acute beneath; exceedingly thin, transparent, and of a pale yellowish-brown.

Genus 5.—ONCHIDIUM.—*Lamarck.*

Generic Character.—Body oblong, creeping, marginated on all sides; head projecting, the lower part with a prominent margin; two rectractile, cylindrical tentacula; two auriform appendages at the sides of the mouth, which is destitute of maxillary processes; the respiratory and anal orifices distinct, placed under the posterior extremity of the body. Destitute of a shell.

Annals du Museum, vol. v., p. 38, plate 6.

SECTION II.—HYDROBRANCHIÆ.

The branchiæ formed of filaments or laminæ, and pectinated or tufted. The animals respire in water.

TRIBE II.—LAPLYSIACEA.

The branchiæ placed in a particular cavity, situated near the posterior region of the back, and covered by an opercular shield; the animals possessing tentacula.

Genus 6.—DOLABELLA.—*Lamarck.*

Generic Character.—Body creeping, oblong, narrowed in front, posteriorly widened, and there truncated obliquely by an orbicular inclined plane; the margins folded over the back; four somewhat tubular tentacula, disposed in pairs; branchial operculum enclosing a shell; anal orifice situated on the back, near the branchiæ, in the middle of the orbicular disk. Shell oblong, slightly arcuated, thicker, callous, and somewhat spiral, on one side.

Dolabella Rumphii.—Rumphius's Dolabella. Plate XIII. fig. 30. Base thick, callous, and subspiral; dilated above, thin, and wedge-shaped. Inhabits the Indian ocean, the Isle of France.

Genus 7.—LAPLYSIA.—*Linnæus.*

Generic Character. — Body creeping, oblong, convex above; bordered on each side by a broad mantle, which covers the back when the animal is quiescent; head and neck elevated; with four tentacula, of which the two upper ones are ear-shaped; the eyes situated near the mouth before the ear-shaped tentacula; the dorsal shield semicircular, sub-cartilaginous, adhering on one side, and covering the branchial cavity; anal orifice placed behind the branchiæ.

Laplysia radiata.—The Radiated Laplysia. Plate XIV. fig. 25. Nearly round, left margin somewhat reflected; outer lip acute; yellowish horn-coloured, with brown radiations, and two concentric bands.

TRIBE III.—BULLACEA.

The branchiæ situated in a particular cavity, near the posterior region of the back, and covered by the mantle; *no* tentacula.

Genus 8.—BULLA.—*Linnæus.*

Generic Character.—Body oblong-ovate, slightly convex; divided into two transverse portions above, and having the mantle slightly folded posteriorly; no apparent tentacula; branchiæ on the fore part of the back, and covered; anal opening placed in the right side. The posterior part of the body covered by an involute shell, with neither pillar nor spire; aperture extending the whole length of the shell.

Bulla lignaria.—THE WOOD-LIKE BULLA. Plate XIV. fig. 25. Narrowed towards the top, where it is slightly umbilicated; yellowish-brown, with numerous transverse pale striæ. Two inches long. Inhabits the British seas, and those of Europe generally.

Genus 9.—BULLÆA.—*Lamarck.*

Generic Character.—Body ovate-oblong, somewhat convex above, and divided transversely into two parts; the lateral lobes of the foot thickened and bent upwards; head indistinct, and without tentacula; branchiæ placed on the back. Shell concealed in the mantle; thin, somewhat involute on one side, and destitute of a columella or spire; aperture large and wide.

Bullæa aperta.—THE OPEN BULLÆA. Plate XIV. fig. 23. Suborbicular, pellucid, white, faintly striated, and slightly wrinkled; almost entirely open. Half an inch long. Inhabits the British seas, and those of Europe generally.

Genus 10.—RETUSA.—*Brown.*

Generic Character. — Animal unknown. Shell small, oblong-ovate, spiral, outer lip nearly the whole length of the body, and entire; spire very short, volutions prominent.

Retusa plicata.—THE PLAITED RETUSA. Plate XIV. fig. 27. White, opaque, subcylindrical; spire produced; aperture elongated, straitened at top; two transverse plaits,

and several oblique ones, at the base of the columella; outer lip thin, slightly inflected. One-third of an inch long. Inhabits the sea at Dunbar.

Genus 11.—AKERA.—*Brown.*

Generic Character.—Animal not described. Shell elastic, convoluted; apex obtuse, canaliculated, the volutions even with the body; aperture wide at the base, contracted at top, and extending the whole length of the body; columella visible to the end.

Akera flexilis.—THE FLEXIBLE AKERA. Plate XIV. fig. 29. Oval membranaceous, excessively thin and flexible; horn-coloured, with a convolute truncated channelled spire; pillar lip a little thickened and white. Three-fourths of an inch long. Inhabits the British seas.

Genus 12.—DIAPHANA.—*Brown.*

Generic Character. — Animal unknown. Shell small, spiral, fragile, somewhat orbicular; aperture encompassing the body, wide; pillar lip slightly reflected, behind which is a subumbilicus; spire very short, never exceeding two volutions, and hardly rising above the body, which is concave at top.

Diaphana candida.—THE WHITE DIAPHANA. Plate XIV. fig. 30. Pure white, ventricose; aperture whole length of the shell, narrowed at top; spire short; subumbilicated. One-sixth of an inch long. Inhabits the Frith of Forth.

Genus 13.—ACERA.—*Lamarck.*

Generic Character.—Body ovate, convex, transversely divided above into two parts; the foot with dilatations in the form of fins or wings below; head indistinct; branchiæ situated on the back, far behind, and covered by a mantle; no shell.

Acera carnosa.—THE FLESHY ACERA. Cuvier in Annales du Musée, vol. xvi. p. 10. Plate I. fig. 15, 16.

TRIBE IV.—CALYPTRACEA.

The branchiæ are situated in a dorsal cavity near the neck, and elevated within the cavity, or even projecting beyond it; shell invariably external, and covering the animal.

Genus 14.—ANCYLUS.—*Draparnaud.*

Generic Character.—Body creeping, enveloped in the shell; two thick, sub-cylindrical tentacula, with the eyes situated at their internal base; foot large, elliptical; somewhat narrower than the body. Shell thin, obliquely conical; aperture oval, with a pointed apex, which is inclined backwards; margins simple.

Ancylus oblongus.—THE OBLONG ANCYLUS. Plate XIV. fig. 18. Aperture elongated, vertex turned to one side; with fine concentric striæ; pale horn-colour above, inside bluish. One-third of an inch long. Inhabits the fresh waters of Europe.

Genus 15.—CREPIDULA.—*Lamarck.*

Generic Character.—Head of the animal anteriorly forked, having two conical or nearly cylindrical tentacula, with the eyes placed at their exterior base; mouth simple, destitute of jaws, and situated in the bifurcation of the head; branchiæ with long filaments, and projecting from the large branchial cavity; the mantle never bordering the shell; foot minute; anal orifice lateral. Shell ovate, or oblong-ovate, convex on the back, and concave beneath; spire inclining to one side; aperture with a horizontal partition next the spire, extending to nearly the middle of the shell.

Crepidula aculeata.—THE PRICKLY CREPIDULA. Plate XIV. fig. 16. Oval. brown, with acute rough striæ; vertex

recurved; inside with a chamber, and of a bluish or purple colour. One inch long. Inhabits the American seas.

Genus 16.—CALYPTRÆA.—*Lamarck.*

Generic Character.—Animal oval or suborbicular, more or less depressed, not spiral; head broad, with distant lateral tentacula, having the eyes on the middle of their outer border; foot nearly circular, very thin. Shell conical, base orbicular, and summit vertical, imperforate, and acute; internal cavity with a spiral septum.

Calyptræa Sinensis.—THE CHINESE CALYPTRÆA. Plate XIV. fig. 19. Orbicular, subconic, smooth; vertex ending in a small volution; margin entire; cream-yellow; very glossy within, and provided with a laminar plate. Three-fourths of an inch in diameter. Inhabits the Chinese seas.

Genus 17.—PILEOPSIS.—*Lamarck.*

Generic Character.—Animal with two conical tentacula, and the eyes at their base externally; branchiæ formed in a row under the anterior margin of the cavity, near the neck. Shell obliquely conical, anteriorly recurved, with the apex curved and somewhat spiral; aperture of a roundish oval; the anterior margin shortest, and the posterior one large and rounded; the muscular impression elongated, arcuated, and transverse, situated under the posterior margin.

Pileopsis Ungarica.—THE HUNGARIAN PILEOPSIS. Plate XIV. fig. 31. Conical, vertex slightly spiral; longitudinally striated, and transversely wrinkled; covered with a fawn-coloured hairy or filamentous epidermis; inside smooth, glossy, white, or rose-colour. Two inches in diameter. Inhabits the seas of Europe.

Genus 18.—FISSURELLA.—*Lamarck.*

Generic Character.—Animal with the head truncated in front; two conical tentacula, with eyes at their exterior

base; mouth simple, terminal, and destitute of jaws; two pectinated branchiæ projecting from the cavity; mantle large, protruding beyond the shell. Shell shield-shaped, conically depressed; concave within; the vertex perforated; destitute of a spire.

Fissurella Græca. — THE GREEK FISSURELLA. Plate XIV. fig. 20. Ovate-oblong, convex; the vertex with an ovate perforation; striæ cancellated and elevated, and the sections tuberculated; opening oblong-ovate, white or bluish; outside yellowish-brown, sometimes clouded. Half an inch long. Inhabits the European seas.

Genus 19.—SIPHO.—*Brown.*

Generic Character.—Animal unknown. Shell subconic, vertex turned to one side, slightly spiral, with a small fissure near the apex; inside having a rhombic funnel-shaped siphon, corresponding with the external fissure; ovate.

Sipho striatus.—THE STRIATED SIPHO. Plate XIV. fig. 21. White, with strong divergent striæ and faintly striated concentrically; margin slightly crenulated; the fissure triangular. Three-eighths of an inch long. Inhabits the sea at Greenock.

This is the Fissurella Noachina of Sowerby and Lyell; Patella Noachina of Linnæus.

Genus 20.—EMARGINULA.—*Lamarck.*

Generic Character.—Body creeping; having two conical tentacula, with the eyes placed at their external base; mantle very large, partly covering the margin of the shell by its replicate borders; foot broad and very thick. Shell conical, shield-shaped; vertex inclined to one side; internal cavity simple; the dorsal margin with a fissure.

Emarginula fissura.—THE SLIT EMARGINULA. Plate XIV. fig. 17. Oval, with reticulated striæ, and ribs radiating from the vertex, which is obtuse and slightly recurved; margin with a fissure, which extends nearly half-way to the vertex; inside glossy white. Three-eighths of an inch

long. Inhabits the British seas, as well as those of other parts of Europe.

Genus 21.—PARMOPHORUS.—*Lamarck.*

Generic Character.—Body creeping, very thick, oblong-ovate, broad behind, obtuse at the extremities; border of the mantle cleft before, and suspended vertically around; back shell shield-shaped, and partly covered; head distinct, and slit below; two conical contracted tentacula, at the base of which are placed the eyes, which are somewhat pedunculated; mouth below, funnel-shaped, oblique, truncated, and concealed; branchial cavity opening anteriorly behind the head by a transverse fissure. Shell oblong, somewhat in the form of a parallelopiped; slightly convex above, with a small sinus before; apex minute, pointed, inclined backwards.

Parmophorus Australis.—THE AUSTRALIAN PARMOPHORUS. Plate XIV. fig. 22. Shell oblong, depressed; vertex slightly recurved; concentrically striated; the posterior margin rounded, and the anterior truncated. Two inches long. Inhabits the Australian coasts.

TRIBE V.—SEMIPHYLLIDIA.

Branchiæ situated under the margin of the mantle, and set in a longitudinal series, on the right side of the body. The animals respire water.

Genus 22.—UMBRELLA.—*Lamarck.*

Generic Character.—Body of the animal very thick, somewhat oval, and provided with a dorsal shell; foot very large, smooth, and flat underneath, surrounded by a border, anteriorly notched, attenuated behind; head indistinct; four tentacula, the two upper ones thick, short, and truncated, the other two thin, and shaped like pedunculated crests; foliaceous branchiæ, between the foot and the slight margin of the mantle, along the right side. Shell external, orbicu-

cular and somewhat irregular; slightly convex above, with the vertex towards the centre; internal cavity but slightly hollowed, with a coloured, callous disk, impressed in the centre.

Umbrella Indica.—THE INDIAN UMBRELLA. Plate XIV. fig. 24. Ovate, slightly convex above; the vertex towards the centre; whitish, with the summit yellow; longitudinally striated, and concentrically wrinkled; inside with radiating striæ. Four inches in diameter. Inhabits the Indian seas.

Genus 23.—PLEUROBRANCHUS.—*Lamarck.*

Generic Character.—Body creeping, fleshy; mantle and foot expanded; branchiæ placed on the right side; cloak enveloping the shell; neck short, contracted in some species, with an emarginate front, exhibiting the commencement of the inferior tentacula, the upper ones tubular and hollow; branchiæ at the edge of the dorsal plait, in front of which are the generative and anal orifices; mouth provided with a short retractile proboscis. Shell dorsal and internal, thin, flat, and obliquely oval.

Pleurobranchus plumula.—THE PLUMED PLEUROBRANCHUS. Plate XIV. fig. 14. Ovato-oblong, depressed, pellucid, yellowish-white, concentrically wrinkled, almost entirely open, rounded, and convoluted; the vertex with a single turn. Half an inch long. Inhabits the Devonshire coast.

TRIBE VI.—PHYLLIDIACEA.

The branchiæ situated beneath the margin of the mantle in a longitudinal series around the body. Animals respiring water.

Genus 24.—PATELLA.—*Linnæus.*

Generic Character.—Body completely covered by the shell; head with two pointed tentacula, having the eyes situated at their exterior base; branchiæ placed in a series

under the mantle and around the body; anal and generative orifices situated on the right anterior side. Shell univalve, not spiral, concave within, simple, entire, with the vertex anteriôrly inclined, and imperforate.

The anterior side of the shell, is that to which the summit is inclined, and the impression of the animal's head can easily be distinguished internally on that side.

Patella vulgata.—THE COMMON PATELLA, OR LIMPET. Plate XIV. fig. 15. Oval, conic, or a little depressed; outside green or brown, sometimes radiated with various colours; having divergent striæ and concentric wrinkles; inside glossy, iridescent, with yellow or fawn-coloured, purple, blue, or brown radiations. Two inches long. Inhabits the coasts of Europe.

Genus 25.—CHITON.—*Linnæus.*

Generic Character.—Body creeping, ovate-oblong, convex, rounded at both extremities; marginated all round with a coriaceous skin; the back covered by a longitudinal series of testaceous, transverse, imbricated, and moveable plates; head anterior, sessile, with the mouth placed below; destitute of tentacula or eyes; branchiæ placed in a series, round the body, under the margin of the skin; anal orifice at the posterior extremity.

The species of this genus are in much obscurity, and of difficult solution. The absence or presence of granulations, striæ, and punctures, are certainly of much use, but the only certain test is an examination of the sides of the valves, which, however, cannot be accomplished without taking the specimen to pieces. The sides of the valves are always provided with a certain number of serrated teeth, which seem to afford permanent characters in each species. See Plate I. fig. 11.

Chiton fascicularis.—THE FASCICULATED CHITON. Plate XIV. fig. 13. Eight imbricated valves, nearly smooth, slightly carinated, and rounded at the margins, with thick tufts of hair between the junctions of the valves, there being five on the top of the upper valve, and three on the base of the lower one. Three-fourths of an inch long. Inhabits the British coasts.

Genus 26.—CHITONELLUS.—*Lamarck.*

Generic Character.—Body creeping, elongated; middle of the back provided in its entire length with a multivalve shell, of which the alternate pieces, for the most part longitudinal, are connected by their extremities, in the form of a band; sides naked; branchiæ disposed around the body; foot cleft longitudinally by a deep furrow.

The testaceous plates of this genus are never joined like those of the Chiton, so that the animal can move in every direction. Upon the contraction of the animal after death, however, these valves become nearly united.

Chitonellus striatus.—THE STRIATED CHITONELLUS. Plate XIV. fig. 10. Each valve with striæ radiating from its apex; the margins serrated; the base of the last valve obtuse. Inhabits the seas of New Holland.

TRIBE VII.—TRITONACEA.

With external branchiæ, placed over the mantle on the back or sides. Destitute of shells, and respiring water. An extensive and highly interesting tribe of slug-like marine animals, of which the genera, not being furnished with shells, do not properly enter into a merely conchological arrangement.

ORDER V.—PTEROPODA.

Animals destitute of a foot for locomotion, and of arms for seizing their prey; but provided with two opposite and similar fins fitting them for swimming; body free and floating; some of them are destitute of shell.

Genus 1.—CYMBULIA.—*Cuvier.*

Generic Character.—Body oblong, gelatinous, pellucid, enclosed in a shell; head sessile; two eyes, and two re-

tractile tentacula; mouth with a retractile proboscis; two opposite, oblong-ovate, branchiferous wings, connate at their posterior base, being connected by an intermediate lobiform appendage. Shell gelatino-cartilaginous, transparent, and oblong; apex truncated; aperture lateral, anterior.

Cymbulia Peronii.—PERON'S CYMBULIA. Plate XIV. fig. 6. Somewhat gelatinous, or cartilaginous; very transparent crystalline; oblong, pointed at the vertex, truncated at the base; general shape like a Turkish slipper. Two inches long. Inhabits the Mediterranean.

Genus 2.—LIMACINA.—*Lamarck.*

Generic Character.—Body soft, oblong; two branchial fins situated at the base of the neck; posterior part of the body spiral, and enveloped in a shell. Shell thin, fragile, papyraceous, spiral, with the volutions connected in a discoid form.

Limacina helicialis.—THE HELIX-LIKE LIMACINA. Plate XIV. fig. 11. Thin, fragile, spiral; the volutions united in a discoid form. Half an inch in diameter. Inhabits the North seas.

Genus 3.—CLEODORA.—*Peron.*

Generic Character.—Body oblong, gelatinous, contractile; with a head in front, and two wings; the posterior part enveloped in a shell; head distinct, projecting, rounded; two eyes; mouth in the form of a small beak; destitute of tentacula; two opposite membranaceous, pellucid, and cordated wings or fins, placed at the base of the neck. Shell or sheath gelatinoso-cartilaginous, transparent, and in the form of a reversed pyramid.

Cleodora pyramidata. — THE PYRAMIDAL CLEODORA. Plate XIV. fig. 9. Pyramidal, triangular; of a gelatinous or cartilaginous substance, very thin and transparent; aperture obliquely truncated. Inhabits the American seas.

Genus 4.—HYALÆA.—*Lamarck.*

Generic Character.—Body enclosed in a shell; two opposite retractile, rather large fins, inserted at the sides of the mouth; head indistinct; mouth terminal, placed at the junction of the fins; no eyes; branchiæ lateral. Shell horny, transparent, oval-globular, with three teeth behind, open at the summit and the two posterior sides.

Hyalæa tridentata.—THE THREE-TOOTHED HYALÆA. Plate XIV. fig. 12. Transparent, horn-coloured, globular; posteriorly tridentate; summit and two posterior sides open; very finely striated transversely. Three-fourths of an inch long. Inhabits the Mediterranean, and the seas of warm climates.

CLASS II.—CONCHIFERA.

Animals soft, inarticulated, destitute of head or organs of vision, and always fixed within a bivalve shell; having external branchiæ, situated between the body and the mantle, which is very large, and forms two thin lobes, enveloping the whole body; a simple circulation, and a unilocular heart.

All the animals of this class live in the sea or in fresh water. None of them have an internal shell. The body is invariably soft, and the mouth is situated near the hinge anteriorly.

Lamarck divides this class into the two following orders: —I. MONOMYARIA, with one muscle of attachment; shell exhibiting interiorly but one subcentral muscular impression.—II. DIMYARIA, having at least two muscles of attachment; the shell exhibiting interiorly, two separate, lateral, muscular impressions.

ORDER I.—MONOMYARIA.

The animal provided with one muscle of attachment, leaving a nearly central impression in each valve of the shell.

SECTION I.—Ligament either unknown, or forming a tendinous tube, which connects the valves.

TRIBE I.—BRACHIOPODA.

Animal with two opposite, elongated, ciliated arms, situated near the mouth, and rolled up spirally when the animal is at rest; mantle having two separate lobes in front, which envelop the body. Shell bivalve, adhering to extraneous marine bodies, either by the shell itself being in contact with them, or attached by a tendinous chord. The shells are not quite equivalve, and open by a hinge.

Genus 1.—LINGULA.—*Lamarck.*

Generic Character.—Subequivalve, flat, ovato-oblong, truncated at the apex, slightly pointed at the base, elevated on a fleshy tendinous peduncle, attached to marine bodies; hinge without teeth.

Lingula anatina.—THE DUCK LINGULA. Plate XIV. fig. 7. Shaped like a duck's bill, with a green, shining epidermis, and having a cylindrical pedicle from two to four inches long. Inhabits the Indian ocean.

Genus 2.—TEREBRATULA.—*Lamarck.*

Generic Character.—Inequivalve, regular, subtrigonal; attached by a short pedicle to extraneous marine bodies; the larger valve with a projecting umbo, frequently curved, and perforated at its summit by a round hole, or a notch; hinge with two teeth; two slender osseous processes arising from the disk of the smaller valve internally.

This genus contains two sections:—* Shell without furrows or striæ. ** Longitudinally furrowed.

The distinction between this genus and that of Anomia, is that in the latter the perforation is always in the smaller valve, while in the Terebratula it is in the larger one. There is, however, a still greater distinction in the animals.

Terebratula Cranium.—THE SKULL TEREBRATULA. Plate XIV. fig. 1. Slightly ovate, ventricose; summit of the convex valve produced and blunt; with divergent striæ, and the margin crenulated. Half an inch long. Inhabits the sea at the Zetland Islands.

Genus 3.—ORBICULA.—*Lamarck.*

Generic Character.—Suborbicular, inequivalve; without apparent hinge; under valve very thin, depressed, and adhering to marine bodies; upper valve subconic, with the vertex acute, and more or less elevated.

Orbicula Norwegica.—THE NORWEGIAN ORBICULA. Plate XIV. fig. 32. Upper valve in the form of a depressed cone, with a produced and pointed summit. Inhabits the Norwegian seas.

TRIBE II.—RUDISTA.

Animal unknown, as are also the ligament and hinge; shell with very unequal valves, and having no distinct umbones.

Genus 4.—CRANIA.—*Bruguiere.*

Generic Character.—Inequivalve, suborbicular; under valve flattened, fixed below, and perforated on its inner surface by three unequal oblique holes; upper valve very convex; provided interiorly with two projecting callosities.

Crania personata.—THE MASKED CRANIA. Plate XIV. fig. 5. Orbicular; the upper valve more gibbous and somewhat conical; lower valve flat, with three pits. Inhabits the Indian ocean.

Genus 5.—DISCINA.—*Lamarck.*

Generic Character.—Inequivalve, of a roundish oval shape, and depressed; valves equal in size, each provided with an orbicular and central disk; that of the upper valve not perforated, but having a mammillated projection in the centre; the lower valve divided by an oblong fissure.

Discina ostreoides.—THE OYSTER-LIKE DISCINA. Plate XIV. fig. 8; *a*, the upper valve; *b*, the under valve. Upper valve longitudinally ribbed, crossed by concentric striæ. Five lines long. Inhabits the Zetland and Hebridian seas.

Genus 6.—BIROSTRITES.—*Lamarck.*

Generic Character.—Inequivalve, with two horns; the disks of the valves elevated, conical, and unequal, obliquely diverging, and nearly straight, in the form of horns; the one valve enveloping the other at the base. Fossil.

Genus 7.—CALCEOLA.—*Lamarck.*

Generic Character.—Inequivalve, triangular, turbinated, flattened beneath; the large valve hollowed like a hood, and truncated obliquely at the aperture; the smaller valve somewhat orbicular, and in the form of a lid, having a furrow in the centre. Fossil.

Genus 8.—RADIOLITES.—*Lamarck.*

Generic Character.—Shell inequivalve, striated externally, the striæ radiating from the umbo; lower valve turbinated, and larger; the upper convex or conical, and lid-shaped. Fossil.

Genus 9.—SPHÆRULITES.—*Lamarck.*

Generic Character.—Shell inequivalve, orbiculato-globose, somewhat depressed above, roughened with large subangular spreading scales; the upper valve the least, flattened, lid-

shaped, with two unequal tubercles within; under valve subventricose, with the scales radiating beyond the margin, its cavity obliquely conical, and forming a ridge by a replication of its margin; inside partly striated; hinge unknown.

SECTION II.—Ligament not marginal, enclosed in a short hollow under the beak, always perceptible, and not forming a tendinous chord beneath the shell.

TRIBE I.—OSTRACEA.

Ligament placed either internally or nearly so; shell irregular in form, foliaceous, and sometimes papyraceous.

* Papyraceous, thin shells, with the ligament internal.

Genus 10.—ANOMIA.—*Linnæus.*

Generic Character.—Shell inequivalve, irregular, operculated, adhering by the operculum; under valve flattened, with a perforation or slit near the umbo, through which protrudes a testaceous, straight, elliptical operculum, or plug, by which the shell adheres to extraneous bodies; upper valve larger, concave, and entire; ligament large, internal, and cardinal.

Anomia undulata.—THE WAVED ANOMIA. Plate XIV. fig. 2. Suborbicular, pellucid, with strong, irregular, undulated, longitudinal striæ, and some transverse concentric ones; outside yellowish dirty green; inside fine green; the ligament perforation large, ovate; muscular impression star-shaped. Two inches broad. Inhabits the British coasts.

Genus 11.—PLACUNA.—*Lamarck.*

Generic Character.—Shell free, subequivalve, irregular, very flat; hinge internal, with two short longitudinal divergent ribs, in the form of the letter V, which fit into two grooves in the opposite valve, held together by the ligament.

Placuna placenta.—THE PLACENTA PLACUNA. Plate XIV. fig. 3. Suborbicular, flat, white, and pellucid, with fine longitudinal striæ, slightly decussated. Six inches or more in diameter. Inhabits the coasts of China, and the Indian seas.

** Shell foliaceous, frequently ponderous, with a semi-internal ligament.

Genus 12.—VULSELLA.—*Lamarck.*

Generic Character.—Shell longitudinal, subequivalve, irregular, and free; umbones equal; hinge, with a projecting callosity depressed above, and a conical obliquely arcuate hollow for the ligament; within each valve a lengthened muscular impression.

Vulsella lingulata.—THE LATCHET VULSELLA. Plate XIV. fig. 4. Elongated, depressed, transversely striated; pale yellowish brown, with longitudinal undulated darker stripes. Four inches long. Inhabits the Indian ocean.

Genus 13.—OSTREA.—*Linnæus.*

Generic Character.—Shell adhering to extraneous bodies; inequivalve and irregular, with the beaks separated, the upper valve advancing as the animal enlarges; hinge without teeth; the lower valve larger, concave, ligament semi-internal, fixed in the cardinal depressions, of which that of the lower valve is sometimes prolonged, with the umbo, as the animal advances in age.

This genus has two sections; * with a simple margin, and not plicated, ** margins plicated.

Ostrea edulis.—THE EDIBLE OYSTER. Plate XV. fig. 3. Suborbicular, rugged, with undulated, imbricated scales, and transversely striated; one valve flat, and the other convex; outside brownish-green; inside pearly-white; exceedingly variable in form and size. Inhabits the coasts of Europe.

Genus 14.—GRYPHÆA.—*Lamarck.*

Generic Character.—Shell inequivalve, free; lower valve large and concave, with the beak large, projecting, and spirally curved or involute; upper valve small, flat, and resembling a lid; hinge without teeth; the cardinal hollows oblong, arcuated; a single muscular impression. Animal unknown.

This genus is distinguished from Ostrea by the very deep and crenated lower valve, and by its summit being terminated by a long spirally incurved beak, slightly turned to one side; and the edge sharp and angular.

Gryphæa angulata.—THE ANGULATED GRYPHÆA. Plate XV. fig. 1. Oblong-ovate, with three longitudinal, carinated ribs below; beak large, somewhat oblique. Four inches long. Habitation unknown. A specimen of this rare shell is in the Museum of the Jardin du Roi, at Paris.

TRIBE II.—PECTINIDES.

Shell for the most part regular, compact, and not foliaceous; the ligament either internal, or partly so.

Genus 15.—PODOPSIS.—*Lamarck.*

Generic Character.—Shell inequivalve, nearly regular, adhering by its lower beak; without ears; the lower valve larger, more convex, and produced at the base; hinge without teeth; ligament internal. Found only in a fossil state. They nearly approximate the genus Gryphæa, from which they are distinguished by the summit of the lower valve not being recurved, though much advanced beyond the upper valve.

Genus 16.—SPONDYLUS.—*Linnæus.*

Generic Character.—Shell inequivalve, adherent, cared, spined, and rough, with unequal beaks; lower valve with

an external flattened cardinal space divided by a longitudinal groove, and increasing with the age of the animal; hinge with two very strong hooked teeth in each valve, and a central cavity for the ligament, communicating at its base with the external groove; ligament internal.

Spondylus longispina.—THE LONG-SPINED SPONDYLUS. Plate XV. fig. 2. Longitudinally sulcated and ribbed, thickly spined; of a reddish colour; alternate spines, arcuated and tongue shaped; umbones orange. Four inches long. Inhabits the Indian ocean.

Genus 17.—PLICATULA.—*Lamarck.*

Generic Character. — Shell inequivalve, without ears, attenuated at the base, rounded and plaited at the upper margin; beaks unequal and entire; hinge with two strong teeth in each valve, with a central cavity for the ligament, which is internal.

Plicatula ramosa.—THE BRANCHED PLICATULA. Plate XV. fig. 4. Oblong-trigonal, very thick; with strong longitudinal plaits; brown, or yellowish-brown, with rust-coloured, arrow-shaped markings; inside white. One inch and a half long. Inhabits the American seas.

Genus 18.—PECTEN.—*Lamarck.*

Generic Character. — Shell free, regular, inequivalve, eared; the lower margin transverse, straight; beaks contiguous; hinge without teeth; ligament internal, placed in a triangular cavity.

It has two sections—* ears equal or nearly so—** ears unequal.

Pecten varius.—THE SPECKLED PECTEN. Plate XV. fig. 5. Ears very unequal; having about thirty-two ribs, covered with transverse prickly suberect scales; variously clouded and speckled with a variety of colours. Two inches and a quarter long. Inhabits the European seas.

Genus 19.—PLAGIOSTOMA.—*Lamarck.*

Generic Character.—Shell subequivalve, free, somewhat eared; base of the hinge transverse and straight; beaks somewhat remote; hinge without teeth; depression, for the reception of the ligament, conical and partly internal. Species all fossil.

Plagiostoma spinosum.—THE THORNY PLAGIOSTOMA. Plate XV. fig. 6. Subarcuated, the umbo of one shell higher than that of the other, with longitudinal ribs, and remote concentric rings. Fossil. Britain.

Genus 20.—LIMA.—*Bruguiere.*

Generic Character.—Shell longitudinal, nearly equivalve, with small ears; valves gaping at the sides; beaks separate; cavity for the ligament partly external; hinge without teeth.

Lima vitrina.—THE GLASSY LIMA. Plate XV. fig. 7. Oblong-ovate; extremely pellucid, and pure snowy-white, with longitudinal distinct striæ; lower margin denticulated. One half inch long. Inhabits the British seas.

Genus 21.—PEDUM.—*Lamarck.*

Generic Character.—Shell inequivalve, subauriculate; the lower valve tumid; beaks unequal, separate; hinge without teeth; ligament partly external, inserted in an elongated groove, in the internal surface of the beaks; lower valve, with a notch near the posterior margin.

Pedum spondyloideum.—THE SPONDYLUS-SHAPED PEDUM. Plate XV. fig. 9. Ovate, wedge-shaped, flat; the upper valve with longitudinal striæ, white, granulated, and rough, slightly tinged with purple near the beak. Two inches and a half long. Inhabits the Indian ocean, and the seas of the Isle of France

SECTION III.—Ligament marginal and elongated.

TRIBE I.—MALLEACEA.

With foliaceous shells, more or less inequivalve; having the ligament marginal, somewhat linear, and either simple or interrupted by crenulations.

Genus 22.—MELEAGRINA.—*Lamarck.*

Generic Character.—Somewhat equivalve, rounded and scaly on the outside: a sinus at the posterior base of the shell for the passage of the byssus, at which place the left valve is notched and narrow; hinge linear, and destitute of teeth; ligament marginal, elongated, and placed nearly exterior, and dilated in the centre.

In many respects resembling Avicula, but differing in being equivalve, and always without the elongated transverse base, on the cardinal tooth. The sloping sides of the opening, admitting the passage of the byssus, are perceptible on both valves, which is never the case with Avicula, where a notch answers the same purpose.

Meleagrina margaritifera.—THE PEARL-BEARING MELEAGRINA. Plate XV. fig. 10. Somewhat square, compressed; undulated, and transversely striated, with a series of lamelliform longitudinal scales; greenish on the outside and perlaceous within. Ten or twelve inches long. Inhabits the Indian seas.

Genus 23.—AVICULA.—*Lamarck.*

Generic Character.—Shell inequivalve, fragile, with the base straight, transverse, and produced at both extremities, the anterior of which is caudiform; valves oblique; the left one emarginate, with a sinus or notch, through which the byssus passes; hinge linear, with one tooth in each valve, under the beaks; ligament linear and marginal, placed in a long narrow groove.

Avicula Anglica.—THE ENGLISH AVICULA. Plate XV. fig. 11. Wing moderate, obliquely curved; yellowish fawn-

coloured, with dark reddish-brown blotches; inside perlaceous and iridescent. One inch and a fourth long. Inhabits the Devonshire coast.

Genus 24.—MALLEUS.—*Lamarck.*

Generic Character.—Subequivalve, rugged, distorted, frequently elongated; sublobate at the base; beaks small, diverging; hinge without teeth, with an elongated conical furrow under the beaks; ligament subexternal, short, placed in the sloping area, at the base of the valves.

Approximating in form to Perna, but very different in the structure of its hinge, and in this respect more nearly resembling Avicula, though it cannot be mistaken for it, both being without the sulcated teeth or joints at the hinge; but the conical cavity, situated under the beaks of the Malleus, and crossing the angle of the slope of the ligament, at once distinguishes it from Avicula.

Malleus albus.—THE WHITE MALLEUS. Plate XV. fig. 12. Trilobate; lateral lobes of the base prolonged, sinus none, or not distinct from the pit for the ligament· white, with transverse undulations. Four inches long. Inhabits the Australian seas.

Genus 25.—PERNA.—*Lamarck.*

Generic Character.—Subequivalve, flattened, slightly distorted, of a lamellar texture; hinge linear, marginal, and many toothed; these are furrow-like, parallel, and transverse, not inserted in the opposite furrows, but with the ligament inserted between them; sinus for the byssus somewhat gaping, and placed under the extremity of the hinge.

The substance of the shell, although solid, is formed of flaky portions, not adhering closely to each other, and giving it a foliaceous appearance.

Perna Ephippium.—THE SADDLE PERNA. Plate XV. fig. 13. Compressed, suborbicular; hind side produced, the margin very acute; purplish-brown on the outside, and pearly within. Four inches long. Inhabits the Indian seas.

Genus 26.—CRENATULA.—*Lamarck.*

Generic Character.—Subequivalve, flattened, somewhat distorted and lamellar; without any particular opening for the byssus; hinge lateral, linear, marginal, and crenated; the crenulations in a regular series, callous, and hollowed for the reception of the ligament.

The distinction betwixt this genus and Perna, consists in the hinge of Crenatula being composed of slightly concave callous crenulations, which receive the ligament; while in Perna it consists of parallel truncated linear teeth, corresponding and opposed to the opposite ones, the ligament being inserted in their interstices only.

Crenatula mytiloides.—THE MUSCLE-SHAPED CRENATULA. Plate XV. fig. 14. Oblong-ovate, oblique; the base acute; violet-coloured, with obscure radiations. Inhabits the Red sea.

TRIBE II.—MYTILACEA.

Hinge with a subinternal marginal ligament, which is linear, very entire, and occupies a considerable portion of the anterior margin; shell rarely foliaceous, generally thin, and brittle.

Genus 27.—PINNA.—*Linnæus.*

Generic Character.—Longitudinal, wedge-shaped, equivalve, gaping at the end, and pointed at the summit, with the beaks straight and acute; hinge lateral and without teeth; ligament marginal, linear, very long, and half internal.

Pinna ingens.—THE HUGE PINNA. Plate XV. fig. 15. Nearly triangular, horn-coloured, smooth, with distant foliations; striated on one side, with rough scaly wrinkles on the broader end. Twelve inches long. Inhabits the coast of Britain.

Genus 28.—MYTILUS.—*Linnæus.*

Generic Character.—Longitudinal, equivalve, with the

base acute, affixed by a byssus; beaks acute, nearly straight, and terminal; hinge lateral, generally with teeth; ligament marginal, and partly internal; muscular impression elongated, clavate, and sublateral.

Section * Longitudinally furrowed. ** Without furrows.

Mytilus edulis.—THE EDIBLE MYTILUS. Plate XV. fig. 16. Oblong-oval, nearly smooth, pointed, and slightly carinated at the beak, truncated on one side, and dilated on the other; covered with an olivaceous epidermis; beneath which it is radiated with blue or purple; internal margin blue, the concave part white. Two to three inches long. Inhabits the British seas.

Genus 29.—MODIOLA.—*Lamarck.*

Generic Character.—Subtransverse, equivalve, regular; the posterior side very short; beaks nearly lateral, depressed on the short side; hinge without teeth, lateral and linear; cardinal ligament placed in a marginal furrow, and nearly internal; one muscular impression in each valve, which is sublateral and elongated.*

Distinguished from the genus Mytilus by the beaks not being terminal but placed a little below the apex.

Modiola discors.—THE DISCORDANT MODIOLA. Plate XV. fig. 17. Oblong-oval, very convex, produced and narrower at the anterior end; longitudinally striated on both sides, and transversely in the middle; outside green; inside white or pale pink, and somewhat pearly; margin crenulated at the base; beak oblique. One half inch long. Inhabits the British seas.

TRIBE III.—TRIDACNITES.

Transverse, equivalve, the muscular impressions situated under the centre of the lower margins, and extended on each side.

* Both in Mytilus and Modiola there are in reality two muscular impressions, although one is very small.

Genus 30.—HIPPOPUS.—*Lamarck.*

Generic Character.—Equivalve, regular, inequilateral, and transverse; lunule closed; hinge with two compressed unequal teeth; ligament marginal, and external.

Distinguished from the Tridacna, by having the posterior slope closed, or nearly so, and the inner margin dentated at that part. The spines which arm the ribs are tubular, and are never arched or vaulted.

Hippopus maculatus.—THE SPOTTED HIPPOPUS. Plate XV. fig. 18. Transversely ovate, ventricose, with scaly ribs; and reddish purple spots; lunule heart-shaped, and oblique; the margins very deeply crenulated. Eight inches broad. Inhabits the Indian seas.

Genus 31.—TRIDACNA.—*Lamarck.*

Generic Character.—Shell regular, equivalve, inequilateral and transverse; a gaping space near the beaks; hinge with two compressed, unequal teeth; ligament marginal and external.

A bundle of tendinous fibres passes through the aperture of the posterior slope, by which the animal affixes itself to rocks, where it remains suspended. Although there is no nacreous substance in the valves themselves, yet the animal sometimes produces very fine pearls, and of large size.

Tridacna gigas.—THE GIANT TRIDACNA. Plate XV. fig. 21. Large, white, transversely ovate; with broad ribs, provided with vaulted scales; the posterior slope heart-shaped and gaping. Two feet six inches long, and four feet six inches broad; the largest of all known shells, sometimes weighing above five hundred pounds. Inhabits the Indian ocean.

ORDER II.—DIMYARIA.

Shell having two separate lateral muscular impressions.

SECTION I.—Shell irregular, and always inequivalve.

TRIBE I.—CHAMACEA.

Shell inequivalve, irregular, and adherent; hinge with one or more teeth; and two distinct, lateral, muscular impressions.

Genus 1.—ETHERIA.—*Lamarck.*

Generic Character.—Shell irregular, inequivalve, adhering; beaks short, and appearing as if sunk in the base of the valves; hinge destitute of teeth; waved, somewhat sinuated, and unequai; with two distinct, remote, oblong muscular impressions; ligament external, tortuous, penetrating partly into the shell.

The shells of this genus differ from those of Chama, in being pearly in their substance, and lamellar in their texture.

SECTION * Shells with an oblong callosity on the base of the valve.

** Shells without an incrusted callosity at their base.

Etheria elliptica.—THE OVAL ETHERIA. Plate XV. fig. 19. Oval, flattened, dilated towards the umbones; the apices remote. Inhabits the Indian ocean.

Genus 2.—CHAMA.—*Lamarck.*

Generic Character.—Irregular, inequivalve, adherent; beaks incurved, unequal; hinge with one thick, oblique, subcrenated tooth, fitting into a socket in the opposite valve; two distant lateral muscular impressions; ligament external, and depressed.

A strong characteristic mark of these shells is the thick, oblique transverse tooth, which resembles a lengthened callosity, and is usually crenated and grooved.

The shells of this genus are always affixed to their bodies by the lower valves.

SECTION * Beaks twisted from left to right. ** Beaks turning from right to left.

Chama Lazarus.—THE LAZARUS'S CHAMA. Plate XV. fig. 20. With imbricated, dilated, waved, obsoletely striated foliations; of a white, orange, red, or yellow colour; white within. Two inches in diameter. Inhabits the American seas.

Genus 3.—DICERAS.—*Lamarck.*

Generic Character.—Inequivalve, adherent; beaks conical, very large, diverging in irregular, spiral contortions; hinge with a large, thick, concave, somewhat ear-shaped tooth projecting in the larger valve; two muscular impressions.

Diceras arietina.—THE RAM-HORNED DICERAS. Plate XVI. fig. 7. Somewhat heart-shaped, with divergent beaks. Fossil.

SECTION II.—LAMELLIPEDES.—The foot depressed, lamelliform, and not posterior.

TRIBE I.—NAYADES.

Shells inhabiting fresh waters; the hinge sometimes having an irregular, simple, or cleft tooth, and a longitudinal, prolonged one, sometimes none; some have irregular, granulated tubercles, the whole length of the upper part; a compound posterior muscular impression; umbones often decorticated.

Genus 4.—IRIDINA.—*Lamarck.*

Generic Character.—Equivalve, inequilateral, transverse; beaks small, turned to one side and nearly straight; two separate lateral, muscular impressions; hinge long, linear, and attenuated near the centre, tuberculous or nearly crenated in its whole length; tubercles unequal; ligament external and marginal.

Iridina Nilotica.—THE NILE IRIDINA. Plate XV. fig. 22. Shell transversely oblong; dark olivaceous green on the outside, somewhat wrinkled concentrically; inside fine

pearly, with iridescent reflections. Five inches long. Inhabits the Nile.

Genus 5.—ANODONTA.—*Lamarck.*

Generic Character.—Equivalve, inequilateral, transverse; hinge linear, without teeth; an adnate, smooth, cardinal lamina, truncated or forming a sinus at the anterior end, terminating the base of the shell; two lateral, remote, twin, muscular impressions; ligament linear, external, sunk in a cleft at the anterior extremity.

The substance of the shell is pearly.

Anadonta cygnea.—THE SWAN ANADONTA. Plate XVI. fig. 1. Ovate, thin, convex, somewhat compressed on the anterior side; with concentric wrinkles; covered with a green epidermis, frequently brown towards the umbo; inside pearly white; beaks small and ventricose. Three inches long, and seven broad. Inhabits the fresh-water lakes in Europe.

Genus 6.—HYRIA.—*Lamarck.*

Generic Character.—Equivalve, oblique, trigonal, eared, with the base truncated and straight, hinge with two spreading teeth, the posterior one cleft into numerous divergent portions; the lateral or anterior tooth strong, elongated, and lamellar; ligament linear, and external.

What distinguishes the shells of this genus particularly is the cardinal or posterior tooth being divided into many lamellar plaits, or pieces, the centre one being very small. This compound tooth is not erect, but slopes in an inclined position towards the posterior side.

Hyria avicularis.—THE LITTLE-BIRD HYRIA. Plate XVI. fig. 2. Umbones smooth and produced, in the form of a tail; ears large, with pointed terminations; a greenish-brown epidermis, and finely striated; inside pearly, and of a rich reddish golden-yellow. Three inches broad. Inhabits the rivers of America.

Genus 7.—UNIO.—*Bruguiere.*

Generic Character.—Shell transverse, equivalve, inequilateral, free; umbones decorticated, and somewhat eroded; posterior muscular impression compound; hinge with two teeth in each valve; the cardinal tooth short, irregular, cleft, and striated; the other oblong, laterally compressed and produced; ligament external.

SECTION * With a short, thick, primary tooth. ** Primary tooth short, compressed, and frequently crested.

Unio pictorum.—THE PAINTER'S UNIO. Plate XVI. fig. 3. Oblong-ovate, strong, anterior side rhomboidal and attenuated; the umbones, somewhat warty; with a dusky-green epidermis, and concentrically wrinkled. Nearly three inches broad. Inhabits the rivers of Europe.

TRIBE II.—TRIGONACEA.

With lamelliform, and transversely striated cardinal teeth. Inhabits the ocean.

Genus 8.—CASTALIA.—*Lamarck.*

Generic Character.—Equivalve, inequilateral, trigonal; umbones decorticated, and inflexed behind; hinge with two lamellar teeth, one of them transversely striated, remote, abbreviated, and subtrilamellar tooth; the other elongated and lateral; ligament external.

The shells of this genus seem to be inhabitants of fresh waters. The substance of the shell is nacreous: the epidermis is strong, and the apices corroded.

Castalia ambigua.—THE AMBIGUOUS CASTALIA. Plate XVI. fig. 4. Ovate, oblique, the umbones truncated; longitudinally ribbed, with distant transverse striæ; epidermis pale chestnut brown; inside pearly. Habitat unknown.

Genus 9.—TRIGONIA.—*Lamarck.*

Generic Character.—Equivalve, inequilateral, trigonal, sometimes suborbicular; teeth of the hinge oblong, laterally compressed, diverging, with transverse furrows; two in the right valve, grooved on both sides; and four in the left valve, grooved on one side only; ligament marginal and external.

Trigonia pectinata.—THE TOOTHED TRIGONIA. Plate XVI. fig. 5. Suborbicular, with radiated or divergent, prominent, and somewhat scaly ribs; inside pearly; margin crenulated. One inch and three-fourths broad. Inhabits the Australian seas.

TRIBE III.—ARCACEA.

Primary teeth small, numerous, and disposed in a line in each valve, which is either straight or interrupted, the teeth of one valve fitting into the intermediate spaces of the other valve.

Genus 10.—NUCULA.—*Lamarck.*

Generic Character.—Transverse, oval-trigonal, or oblong, equivalve, inequilateral; no intermediate area; hinge linear, with numerous pectinated teeth, interrupted in the middle by an oblique produced hollow; beaks contiguous, inflected; ligament marginal, partly internal.

SECTION * Shells sublongitudinal. ** Shells transverse.

Nucula margaritacea.—THE PEARLY NUCULA. Plate XVI. fig. 6. Obliquely ovate, trigonal; striæ minute and almost obsolete; covered with a greenish epidermis; inside silvery perlaceous; margin crenulated; and having regularly pectinated teeth. One half inch long. Inhabits the British seas.

Genus 11.—PECTUNCULUS.—*Lamarck.*

Generic Character.—Orbicular, nearly lenticular, equi-

valve, subequilateral, and close; hinge arcuated, teeth numerous, oblique, alternately inserted into the opposite valves, middle teeth obsolete; ligament external.

This differs from the other genera of many toothed shells, in having the ligament partially inserted internally, and in being destitute of the angular groove on the exterior of the valves.

SECTION * No distinct longitudinal furrows. ** With raised longitudinal radiating ribs.

Pectunculus glycimeris.—THE DELICIOUS PECTUNCULUS. Plate XVI. fig. 8. Suborbicular; finely striated transversely and longitudinally; covered with a villous skin, under which it is marked with reddish-chestnut spots or bands; inside white, and the margin crenulated. From two to three inches long. Inhabits the British and Mediterranean seas.

Genus 12.—ARCA.—*Linnæus.*

Generic Character.—Shell transverse, subequivalve, inequilateral; beaks remote, separated by the area of the ligament; hinge linear, straight, without ribs at the extremities; teeth of the hinge numerous, serrated, closely set, alternately inserted; ligament external.

SECTION * Lower margin not crenated. ** Lower margin internally crenated.

Arca Noæ.—NOAH'S ARK. Plate XVI. fig. 9. Oblong, striated transversely, and longitudinally ribbed; umbones remote, and incurvated; margin entire and gaping; cream-white, with divergent and zigzag chestnut stripes; inside white. Two inches broad. Inhabits the American and British seas.

Genus 13.—CUCULLÆA.—*Lamarck.*

Generic Character.—Shell equivalve, inequilateral, trapeziform, ventricose; beaks distant, separated by the area of the ligament; anterior muscular impression forming a prominence with the margin angulated, or with an eared produced border; hinge linear, straight, with very small

transverse teeth, and having at its extremities from two to five small parallel ribs; ligament entirely external.

Distinguished from the genus Arca, in being more gibbous, the anterior side obliquely truncated, and with an ear-shaped testaceous appendage, placed at the angle of the muscular impression, and forming a chamber or division.

Cucullæa auriculifera.—THE EARED CUCULLÆA. Plate XVI. fig. 10. Obliquely heart-shaped, ventricose, with decussated striæ; reddish-brown; hinge with two parallel ribs at each end; white within, and slightly tinged with violet. Two and a half inches broad. Inhabits the Indian ocean.

TRIBE IV.—CARDIACEA.

Having the primary teeth irregular, either in form or situation; and accompanied by one or two lateral teeth for the most part.

Genus 14.—ISOCARDIA.—*Lamarck.*

Generic Character.—Shell equivalve, heart-shaped, ventricose; beaks very distant, divergent, and spirally turned to one side; hinge with two primary flattened teeth, situated under the beak, and with an elongated lateral tooth under the ligament, which is external.

Isocardia Cor.—THE HEART ISOCARDIA. Plate XVI. fig. 11. Globular, and heart-shaped, concentrically wrinkled; reddish-chestnut or brown, the umbones paler and prominent; inside white. Four inches long. Inhabits the Mediterranean and British seas.

Genus 15.—HIATELLA.—*Daudin.*

Generic Character.—Shell equivalve, considerably inequilateral and transverse; gaping at the upper margin; a small cardinal tooth in the right valve, and two oblique somewhat larger teeth in the left valve; ligament external.

Hiatella arctica.—THE ARCTIC HIATELLA. Plate XVI. fig. 12. Transversely oblong; with the anterior end longer and truncated; the valves with two divergent spiny ridges; yellowish-white, with decussated striæ; inside perlaceous. Half an inch long, and one inch broad. Inhabits the British seas.

It appears to be the same as Saxicava rugosa.

Genus 16.—CYPRICARDIA.—*Lamarck.*

Generic Character.—Shell free, equivalve, inequilateral, obliquely or transversely elongated; teeth of the hinge three, situated under the beaks, and one lateral elongated tooth.

Distinguished from Cardita, with which they are closely allied in form, by having three teeth beneath the apices, like the genus Venus, in addition to the lateral lengthened tooth or ridge.

Cypricardia Guinaica.—THE GUINEA CYPRICARDIA. Plate XVI. fig. 13. Transversely oblong, oblique, angulated, white, and covered with decussated striæ; compressed before, and the apex rounded; yellowish-white. Two inches long. Inhabits the coast of Guinea.

Genus 17.—CARDITA.—*Lamarck.*

Generic Character.—Shell free, regular, equivalve, inequilateral; hinge with two unequal teeth; primary tooth short, straight, placed under the umbo; the other tooth oblique, marginal, and elongated.

Some of the species require minute attention to the teeth, to distinguish them from the Venericardia.

Cardita sulcata.—THE FURROWED CARDITA. Plate XVI. fig. 15. Subcordate, white, tessellated with brown; having longitudinal, convex transversely striated ribs; posterior depression heart-shaped. One inch long. Inhabits the Mediterranean.

Genus 18.—CARDIUM.—*Linnæus.*

Generic Character.—Shell equivalve, subcordiform; beaks

prominent; the internal margins of the valves denticulated or plicated; hinge with four teeth in both valves; the two primary approximate, mutually inserted and crossing each other; two lateral remote entering teeth.

SECTION * Shells with no particular angle at the umbones, and the anterior side at least as large as the posterior. ** With the umbones carinated or angular, the posterior side often much larger than the anterior.

Cardium edule.—THE EDIBLE CARDIUM. Plate XVI. fig. 14. With about twenty-six depressed ribs, and transverse obsolete scales; outside yellowish-white, inside white; beaks protuberant. One to one and a half inch long. Inhabits the European seas, and used as an article of food.

TRIBE V.—CONCHACEA.

With at least three primary teeth in one valve, and the other generally the same, although sometimes with fewer.

SECTION I.—MARINE.

Usually destitute of lateral teeth; epidermis generally wanting, or caducous.

Genus 19.—VENERICARDIA.—*Lamarck.*

Generic Character.—Equivalve, inequilateral, suborbicular; generally with longitudinal radiated ribs; hinge with two oblique teeth in each valve, turned in the same direction.

Venericardia imbricata.—THE IMBRICATED VENERICARDIA. Plate XVI. fig. 17. Suborbicular, having convex longitudinal ribs, covered with imbricated, rough scales. One and a half inch long. Fossil at Grignon.

Genus 20.—ORTYGIA.—*Leach.*

Generic Character.—Shell equivalve, transverse, three primary teeth in each valve, two of which are approximate, and the other remote; with the ligament subexternal; um-

bones turned much to one side; beneath which is an elongated cordiform depression; cartilage slope much depressed, with an elongated groove in the right valve for the reception of the margin of the left valve.

Ortygia Gallina.—THE HEN ORTYGIA. Plate XVI. fig. 19. Somewhat heart-shaped, with obtuse recurved concentric striæ, and three or four radiated bands proceeding from the umbo to the margin, frequently with zigzag markings throughout; inside white; the margin finely crenated. One inch long. Inhabits the British seas.

Genus 21.—VENUS.—*Linnæus.*

Generic Character.—Equivalve, inequilateral, transverse, or suborbicular; hinge with three teeth in both valves, all approximate, the lateral ones divergent at their summits; ligament external; a cordiform depression beneath the beaks.

Two sections.—* Inner margin of the valves crenulated or denticulated.—** Inner margin of the valves entire.

Venus Casina.—THE CASINA VENUS. Plate XVI. fig. 18. Suborbicular, with transverse acute recurved ridges, crenulated on the hind margin; the depression subcordate. Two inches long. Inhabits the British seas.

Genus 22.—CYTHEREA.—*Lamarck.*

Generic Character.—Equivalve, inequilateral, suborbicular, trigonal, or transverse; right valve with four primary teeth, of which three are divergent and approximate at their base, and one remote; three primary divergent teeth in the opposite valve, and a somewhat remote groove parallel to the margin; without lateral teeth.

A principal mark of distinction, betwixt the genus Venus and the Cytherea, is, that all the shells of the latter have four primary teeth in one valve, and only three united on the other, with an isolated cavity, which is oval and parallel to the margin, the lateral teeth divergent to the summit.

Cytherea Chione. — THE CHIONE CYTHEREA. Plate XVI. fig. 21. Somewhat heart-shaped, strong; covered with a chestnut glossy epidermis, faintly wrinkled transversely, longitudinally rayed; with a cordiform depression under the beak. Two and a half inches long. Inhabits the British and Mediterranean seas.

This genus is divided into three sections.—* The anterior primary tooth, with a striated cleft, or the margin dentated.—** Anterior primary tooth not striated in its cleft, nor dentated in the margin.—*** The internal margins crenated or dentated.

Genus 23.—ARTHEMIS.—*Poli.*—EXOLETA.—*Brown.*

Generic Character.—Shell strong, orbicular, beaks much turned to one side, beneath which is a short cordiform impression; hinge with three primary teeth, two of which are contiguous, and the other divergent, which is broad in the right valve, and cleft in the centre, to receive that of the opposite valve, which is slender; cartilage situated within the outer surface of the shell; margins very broad, and somewhat concave; edges very thick.*

Arthemis orbiculata. — THE ORBICULAR ARTHEMIS. Plate XVI. fig. 23. Orbicular, strong, with regular coarse, close set transverse striæ; generally white or pale brown, with sometimes three or four brown radiations emanating from the umbo, and terminating in the margin; inside white. Two inches long. Inhabits the European seas.

Genus 24.—CYPRINA.—*Lamarck.*

Generic Character. — Shell equivalve, inequilateral, obliquely heart-shaped, beaks obliquely bent; hinge with three unequal teeth, approximate at the base, and slightly divergent above; lateral cardinal tooth remote, sometimes obsolete; ligament external, and partly sunk between the beaks.

* The name given to this genus by its founder, Poli, is that here employed. It subsequently received from Captain Brown the name of Exoleta, which, being an adjective, is inadmissible.

Distinguished from the genera Venus, Cytherea, and Arthemis, by having one impressed lateral tooth, on the front side, which is sometimes obsolete; the nymphæ or callosities of the hinge large, arched, and terminated near the apices by a cavity, sometimes very deep.

Cyprina Islandica.—THE ISLANDIC CYPRINA. Plate XVI. fig. 22. Suborbicular, convex, strong, irregularly striated; covered with a deep black-brown epidermis; white within. Three and three-fourth inches long. Inhabits the Atlantic ocean and British seas.

Genus 25.—LASÆA.—*Leach.*

Generic Character.—Equivalve, inequilateral; hinge not quite central; umbo prominent; hinge with two nearly obsolete primary teeth, lateral ones very conspicuous; valves convex; margin plain.

Lasæa rubra.—THE RED LASÆA. Plate XVI. fig. 16. Convex, smooth, glossy, pellucid, reddish-pink. Fourth of an inch long. Inhabits the British seas.

SECTION II.—FLUVIATILE.

Shells with lateral teeth at the hinge, and covered with a spurious epidermis.

Genus 26.—GALATHEA.—*Lamarck.*

Generic Character.—Equivalve, subtrigonal, covered with a greenish epidermis; two furrowed primary teeth in the right valve, joined at their base; and three in the other, the intermediate one being separate and protruding; ligament external, short, turgid, and prominent; the elongated mark protruding in the centre.

Somewhat allied to Cyrena, but distinguished by the divergent form of its primary tooth. They all inhabit fresh waters.

Galathea radiata.—THE RAYED GALATHEA. Plate XVI. fig. 20. Somewhat trigonal, gibbous towards the base; covered with a yellowish-green thin epidermis, beneath which it is radiated with pale chestnut. Three and a half inches long. Inhabits the rivers of Ceylon.

Genus 27.—CYRENA.—*Lamarck.*

Generic Character.—Shell roundish or trigonal; turgid and ventricose, inequilateral, solid, with the beaks usually decorticated; hinge with three teeth in each valve; lateral teeth two, one of which is near the primary ones; ligament external; a great part of which is inserted, and placed on the largest side.

The apices are always eroded or carious in shells of this genus. They frequently grow to a large size, and always inhabit rivers.

Cyrena fluminea.—THE RIVER CYRENA. Plate XVII. fig. 1. Heart-shaped, gibbous, greenish-brown; transversely sulcated; variegated with white and violet in the inside. One inch long. Inhabits the rivers of China.

This genus has two sections.—* With the lateral teeth crenulated or serrated.—** Having the lateral teeth entire.

Genus 28.—CYCLAS.—*Lamarck.*

Generic Character.—Ovate, globular, transverse, and equivalve, with the beaks tumid; cardinal teeth very small, sometimes barely perceptible; *or with two in each valve, of which one is complicated;* or only one plicated or lobed tooth in one valve, and two in the other; lateral teeth transversely elongated, compressed, and lamelliform; ligament external.

The apices are seldom eroded in shells of this genus, of which all the species inhabit fresh-water.

Cyclas cornea.—THE HORNY CYCLAS. Plate XVII. fig 2. Suborbicular, convex, thin, pellucid, with fine concentric striæ; covered with a horn-coloured epidermis; bluish white within. Three-fourths of an inch long. Inhabits rivers of Europe.

Genus 29.—PISIDIUM.—*Pfeiffer.*

Generic Character.—Shell equivalve, transverse, with the sides unequal, completely closing; in the right valve

one, and in the left valve two opposite, very small primary teeth; behind and before, two thin lamellar side teeth; those of the latter cleft in the right valve, in order to receive the opposite ones.

There is sufficient difference betwixt the animals of the Cyclas and Pisidium to warrant the formation of distinct genera; those of the former having a shorter and thicker foot in proportion to the size of the animal, and having a double crested tube at the posterior termination of the cloak, whereas the latter has only a single tube, which however is composed of two siphons. The characters, therefore, in italics, of the genus Cyclas, are inapplicable to that genus, and hold in that of Pisidium.

Pisidium obliquum.—THE OBLIQUE PISIDIUM. Plate XV. fig. 23. Nearly oval, with unequal sides, ventricose, pellucid; striated concentrically, having the appearance of ribs under a lens; yellowish ash-coloured; inside bluish and not glossy; beaks somewhat produced, and pointing towards the anterior slope. Length three lines, breadth nearly five lines. Inhabits rivers and streams in Britain.

SECTION III.—TENUIPEDES.

The mantle barely united before; foot small, narrow, and compressed; shell having but a moderate gape.

TRIBE I.—NYMPHACEA.

Having never more than two primary teeth in the same valve; shell frequently gaping at the lateral extremities; ligament external; umbones usually projecting outwards. The species are all littoral.

* Tellinaria.
a Without lateral teeth.

Genus 30.—ASTARTE.—*Sowerby.*
CRASSINA.—*Lamarck.*†

Generic Character.—Suborbicular, transverse, equivalve,

† This genus was first instituted by Sowerby, who named it Astarte. It was afterwards characterized by Lamarck, under the name of Crassina.

subinequilateral, close; hinge with two strong, diverging, primary teeth in the right valve, and two very unequal teeth in the other; ligament external, on the longest side.

Distinguished from Crassatella, by the position of the ligament; and from Venus, by having but two teeth in each valve; one of which is, besides, but slightly projecting.

Astarte Scotica. — THE SCOTTISH ASTARTE. Plate XVII. fig. 3. Somewhat heart-shaped, a little compressed, with regular parallel grooves and ribs; impressions under the beak lanceolate; covered with a yellow-brown epidermis; inside pure white; margin broad and plain. One inch long. Inhabits the Scottish and Devonshire coasts.

Genus 31.—CAPSA.—*Lamarck.*

Generic Character.—Transverse, equivalve, valves approximate and close; hinge with three primary teeth in the right valve, and a single bifid tooth in the left, inserted into a cavity in the opposite one; no lateral teeth; ligament external.

The ligament is on the short side, as in the genus Donax.

Capsa lævigata.—THE POLISHED CAPSA. Plate XVII. fig. 4. Triangular, subequilateral, obsoletely striated transversely; covered with a greenish-yellow epidermis; inside violet towards the umbones. Two inches long. Inhabits the Indian ocean.

b Shells with one or two lateral teeth.

Genus 32.—DONAX.—*Linnæus.*

Generic Character.—Transverse, equivalve, inequilateral; with the anterior side very short and obtuse; two primary teeth in one or both valves; and one or two lateral teeth, more or less apart; ligament external, short, inserted at the posterior impression.

A well marked characteristic of this genus is, its having at the hinge, besides the primary teeth, one or two lateral teeth, somewhat distant,

and separated from the cardinal teeth, similar to those of Mactra, Lucina, and Tellina. In the genera Cytherea and Venus, the shortest side of the shell is always the posterior; and the longest and largest, having the ligament attached to it, is the anterior; while in Donax, this structure is reversed, the ligament being affixed to the shortest side as in the genus Tellina.

Donax trunculus.—THE TRUNCATED DONAX. Plate XVII. fig. 5. Oblong, glossy, finely striated, and radiated longitudinally; transversely banded with purple; white and clouded with purple within; margin crenulated. One inch and a quarter broad. Inhabits the seas of Europe.

This genus consists of two sections:—* Shells with the margins entire.—** Margins crenated.

Genus 33.—LUCINA.—*Lamarck.*

Generic Character.—Suborbicular, inequilateral; beaks small, pointed, and oblique; hinge variable, sometimes with two divergent teeth, one of which is bifid, but changing with age; two lateral teeth, sometimes obsolete; the posterior nearest the primary ones; two distinct muscular impressions widely separated, the posterior one prolonged.

In the structure of the hinge, Lucina is allied to Tellina, but although in many instances there is a distinctly marked angular depression on the shell, it never possesses the irregular plait or fold characteristic of the Tellinæ.

Lucina undata.—THE WAVED LUCINA. Plate XVII. fig. 7. Orbicular, thin, convex, undulated with fine irregular striæ; pale straw-coloured yellow, and white in the inside; margin glossy and plain. Inhabits the British seas.

Genus 34.—MYSIA.—*Leach.*

Generic Character.—Suborbicular, inequilateral; beaks small, pointed, and very slightly turned to one side; hinge with two primary teeth, joined at their base and divergent, behind which is an oblique descending cavity; with one strong muscular impression in each valve; margin thin and entire; ligament external.

Mysia rotundata.—THE ROUNDED MYSIA. Plate XVII. fig. 6. Orbicular, somewhat convex, thin, sub-pellucid, and obscurely striated; umbones small and oblique. Three quarters of an inch long. Inhabits the British seas.

Genus 35.—CORBIS.—*Cuvier.*

Generic Character. — Transverse, equivalve, without flexuosity at the anterior margin, slightly depressed; beaks small and incurved; hinge with two primary teeth, and two lateral, of which the posterior is nearest the cardinal teeth; muscular impressions simple; ligament external.

Corbis fimbriata.—THE FRINGED CORBIS. Plate XVII. fig. 8. Very thick, white, transversely oval, gibbous, longitudinally striated, with transverse undulated furrows; the margins crenulated; with depressions somewhat lanceolate. Two inches and a half broad. Inhabits the Indian ocean.

Genus 36.—ARCOPAGIA.—*Leach.*

Generic Character.—Transverse, equivalve; right valve sub-depressed; umbones very small, and nearly straight; with two primary teeth in each valve, each of the larger ones being cleft; left valve with two remote lateral teeth, that on the anterior slope large, with a sinus betwixt it and the margin for the reception of the lateral tooth in the opposite valve; muscular impression extremely large, and defined by a deep irregular groove; near its lower centre are several strong punctiform marks; margin very broad, well defined, and glossy; ligament subexternal.

Arcopagia crassa.—THE THICK ARCOPAGIA. Plate XVII. fig. 9. Suborbicular, strong, thick; upper valve flat; with coarse, thick-set, transverse striæ; pale yellow, radiated longitudinally; inside white, with a large patch of yellow or pink; muscular impressions very deep. One inch and a half long. Inhabits the British seas.

Genus 37.—TELLINIDES.—*Lamarck.*

Generic Character.—Transverse, inequilateral, f a little gaping laterally; beaks small, and sub-de margin plain, irregular, but not inflected; two d primary teeth in each valve, and two lateral teeth, v somewhat obsolete, in one valve.

The want of lateral teeth distinguishes the shells of this g Psammobia, and their not being twisted from Tellina; the va close, and their interior having fascial muscular impressio them distinct from the Lucina.

Tellinides rosea.—THE ROSEATE TELLINIDES XVII. fig. 10. Ovate, oblique, polished, thin, a beautiful rosy hue; slightly wrinkled transversely. inch broad. Inhabits the bay of Naples.

Genus 38.—TELLINA.—*Linnæus.*

Generic Character.—Transverse or orbicular; bot generally flattened; the anterior side angular, and on the margin, or marked with a flexuous irregula with one or two primary teeth in the same valve, lateral teeth, frequently remote; edge of the front either valve, in some species provided with a row rated teeth, extending from the apex to the margin; l external.

There are two sections of this genus:—* Transversely oblc ** Orbicular.

Tellina depressa.—THE DEPRESSED TELLINA. XVII. fig 11. Oval, flat, pointed at the smaller e slightly reflected; pale yellowish, faintly striated co cally; covered with a pale brown transparent ep One inch and three-quarters broad. Inhabits the M ranean sea.

** Solenaria.

Genus 39.—PSAMMOTÆA.—*Lamarck.*

Generic Character.—Transverse, ovate, or oblong

slightly gaping at the sides; each valve with a single primary tooth, sometimes in one valve only; ligament external, attached to callosities at the hinge, and without the irregular plait of Tellina. They appear like degenerated Psammobiæ.

Psammotæa violacea.—THE VARIEGATED PSAMMOTÆA. Plate XVII. fig. 13. Transverse, ovate-oblong, sub-ventricose; radiated with purple; transversely striated. Two inches broad. Inhabits the Australian seas.

Genus 40.—PSAMMOBIA.—*Leach.*

Generic Character.—Transverse, elliptical, or oblong-ovate, flattened, slightly gaping at one side; beaks prominent; two primary teeth in the left valve, and one in the right.

Resembling Tellina in form, but slightly gaping at the sides, and devoid of the irregular plait on the anterior part.

Psammobia Ferroensis.—THE FAROE PSAMMOBIA. Plate XVII. fig. 14. Oblong-oval; white, radiated with crimson; finely striated transversely; valves obliquely truncate. One inch and a half broad. Inhabits the European seas.

Genus 41.—SANGUINOLARIA.—*Lamarck.*

Generic Character.—Transverse, somewhat elliptical, slightly gaping at the lateral extremities; upper margin arched, and not parallel to the inferior one; hinge with two approximate teeth in each valve.

At once distinguished from the Solenes, by their never being of a transverse oblong shape, nor with the edge of the valves parallel to the base.

Sanguinolaria rosea.—THE ROSEATE SANGUINOLARIA. Plate XVII. fig. 15. Semi-orbicular, smooth, shining, and convex; of a beautiful rose-colour towards the umbones, which becomes gradually paler as it descends; with acute transverse striæ. One inch and a half broad Inhabits the sea at Jamaica.

TRIBE II.—LITHOPHAGI.

Shells which bore into clay and other substances, \ accessory plaits, and more or less gaping at their ante side; ligament external.

Genus 42.—VENERUPIS.—*Lamarck.*

Generic Character.—Transverse, inequilateral; poste side short, the anterior slightly gaping; hinge with primary teeth in the right valve, three in the left, someti with three in each; teeth small, approximated, parallel, slightly divergent; ligament external.

Nearly allied to Venus, but the teeth are differently disposed, ha three primary teeth in one of the valves at least. Some of the sp of this genus, together with certain oval species of Venus, const the genus Pullastra of Sowerby.

Venerupis perforans.—THE PERFORATING VENERU Plate XVII. fig. 16. Sub-rhombic, transversely stria wrinkled on the anterior side; brown, with a white ins sometimes with a tinge of purple. Three quarters o inch broad. Inhabits the British seas, boring into rocks clay.

It does not appear to be distinct from Venus Pullastra.

Genus 43.—PETRICOLA.—*Lamarck.*

Generic Character.—Subtrigonal, transverse, inequila al; posterior side rounded, anterior attenuated, and slig gaping; hinge with two teeth in each valve, or in one v only.

Petricola pholadiformis.—THE PHOLAS-SHAPED PE COLA. Plate XVII. fig. 17. Transversely elongated; bones very small; with transverse, rough, prickly st posterior side extremely short. Three inches long. habits the Australian seas, boring into wood and rocks.

Genus 44.—SAXICAVA.—*Lamarck.*

Generic Character.—Inequilateral, obtuse, and transverse; the anterior upper margin gaping; hinge nearly without teeth; ligament external.

Saxicava præcisa.—THE ABBREVIATED SAXICAVA. Plate XVII. fig. 18. Oblong, wrinkled, one valve larger than the other, truncated at the posterior end; of a pale horn colour. Three quarters of an inch broad. Inhabits the British seas, in cavities bored in rocks, stones, and wood.

It is probably only a variety of Saxicava rugosa.

TRIBE III.—CORBULACEA.

Inequivalve shells, with an internal ligament; one of the beaks always projecting beyond the other.

Genus 45.—PANDORA.—*Lamarck.*

Generic Character.—Shell regular, inequivalve, inequilateral, transversely oblong; upper valve flattened, lower convex; hinge with two oblong, diverging cardinal teeth, in the upper valve, and the other valve with two oblong grooves; ligament external.

The hinge somewhat like that of Placuna, but more nearly allied to Corbula, having two muscular impressions.

Pandora rostrata.—THE BEAKED PANDORA. Plate XVII. fig. 19. White, oblong, much produced towards the beak; one valve nearly flat, the other convex; rounded at the anterior end. One inch broad. Inhabits the Mediterranean and British seas.

Genus 46.—CORBULA.—*Bruguiere.*

Generic Character.—Shell regular, inequivalve, inequilateral, closed or slightly gaping; with a conical, bent, ascending, primary tooth in each valve; a small pit at its side; destitute of lateral teeth; ligament external.

Although having some affinity to the genera Crassatella, an lina, they are at once distinguished by the inequality of thei and the strong primary elevated tooth.

Corbula Nucleus.—THE KERNEL CORBULA. Plate fig. 20. Somewhat triangular strong, with the unde much larger than the upper one; transversely st covered with a thick, brown epidermis. Half an inc Inhabits the British seas.

TRIBE IV.—MACTRACEA.

Equivalve shells, frequently gaping at the late tremities; with an internal or partly external ligame the animal having a small compressed foot.

* Ligament seen externally or double.

Genus 47.—AMPHIDESMA.—*Lamarck.*

Generic Character.—Inequilateral, transverse, subc somewhat rounded; with sides slightly gaping hing one or two cardinal teeth, and a narrow groove for the nal ligament ligament double, the external short, the nal fixed in the internal grooves.

These possess a peculiar character which distinguishes the all other bivalves, namely, the *two* ligaments.

Amphidesma reticulata.—THE RETICULATED A DESMA. Plate XVII. fig. 24. Suborbicular sub-diaph compressed, finely reticulated yellowish-white. Or and a quarter long. Inhabits the West Indian seas.

Genus 48.—SOLEMYA.—*Lamarck.*

Generic Character.—Inequilateral, equivalve, transv elongated, obtuse at the extremities, with the epi smooth, shining, and projecting beyond the margin; not prominent and hardly distinct; a dilated, compr somewhat oblique cardinal tooth in each valve, slightl

cave above for the reception of the ligament, which is partly external and partly internal.

These shells bear an affinity to both the Solenes, and the Anatinæ. They also strongly resemble the Modiolæ.

Solemya Mediterranea.—THE MEDITERRANEAN SOLEMYA. Plate XVII. fig. 23. Transversely oblong; blackish-brown; longitudinally ribbed, with imbricated, projecting foliations; inside white. Inhabits the Mediterranean sea.

Genus 49.—TELLIMYA.—*Brown.*

Generic Character.—Shell equivalve, inequilateral, sub-orbicular or transverse; left valve without cardinal teeth, but provided with two projecting lateral teeth with a groove in their centre, sometimes with one or two teeth on the right side; right valve with two recurved prominent teeth; margin entire.

This genus consists of two sections.—* Shells orbicular. ** Shells transverse.

Tellimya tenuis.—THE THIN TELLIMYA. Plate XVII. fig. 14. Nearly orbicular, white, thin, ventricose, and shining; one valve, with two teeth locking into a triangular void in the opposite one, with transverse laminæ on each side. One-third of an inch long. Inhabits the British seas.

Genus 50.—UNGULINA.—*Daudin.*

Generic Character. — Longitudinal or subtransverse, rounded above, subequilateral, with the valves close; beaks decorticated; one short primary cleft tooth in each valve, with an oblong marginal groove divided or narrowed in the middle; ligament internal, inserted in a pit.

A remarkable feature in this genus is the cavity being divided into two, the one at the end of the other: the ligament is partially visible.

Ungulina transversa.—THE TRANSVERSE UNGULINA. Plate XVII. fig. 22. Transversely round, rugose, of a yellowish-brown colour.

** Shells with an internal ligament, and not gaping at the sides.

Genus 51.—ERYCINA.—*Lamarck.*

Generic Character.—Transverse, subinequilateral, equivalve, rarely gaping; with two primary teeth, unequal, diverging, with a pit interposed; lateral teeth two, oblong, compressed, short, and inserted; ligament internal, situated in a pit.

There is much difficulty in judging of the hinges of this genus, owing to their equivocal character.

Erycina striata.—THE STRIATED ERYCINA. Plate XVII. fig. 21. Yellowish-green, with strong transverse striæ. One inch long. Inhabits the Indian ocean.

Genus 52.—CRASSATELLA.

Generic Character.—Inequilateral, suborbicular, or transverse, close; primary teeth two, somewhat divergent, with a hollow at the side; lateral teeth, none or obsolete; ligament internal, inserted into a pit in the hinge.

There is a close affinity betwixt this genus and Mactra and Lutraria; like them it has the ligament internal, and attached to the primary cavities of each valve, but when closed, the shells fit exactly, and do not gape like these genera. The ligament in some of the species is partially external, but less visible than in the genus Amphidesma.

Crassatella Kingicola.—THE KING'S ISLAND CRASSATELLA. Plate XVIII. fig. 1. Ovate, orbicular, yellowish-white, with obsolete rays; very minutely striated transversely; the umbones somewhat plicated. Two inches long. Inhabits the sea at King's Island, New Holland.

Genus 53.—LIGULA.—*Montagu.*

Generic Character.—Equivalve, with a broad transverse tooth in each valve, projecting inwards, furnished with a pit for the reception of the cartilage, and in some species a minute tooth.

Ligula prætenuis.—THE VERY THIN LIGULA. Plate XVIII. fig. 2. Oval, flat, thin, brittle; a little gaping; valves with a single, spoon-like tooth in each, projecting horizontally inwards; white, with a few concentric striæ. One inch broad. Inhabits the British seas.

*** Ligament internal; shell gaping at the sides.

Genus 54.—MACTRA.—*Linnæus.*

Generic Character. — Transverse, inequilateral, subtrigonal; sides slightly gaping; beaks prominent; one primary compressed tooth in each valve, and an adjacent heart-shaped cavity; two lateral compressed teeth, situated near the hinge, and inserted; ligament internal and placed in the pit of the hinge.

In some species where the cavity of the hinge is very large, the primary tooth is oblique, and always obsolete; the lateral teeth, however, always erect.

Mactra truncata.—THE TRUNCATED MACTRA. Plate XVIII. fig. 3. Strong, opaque, white; truncated on both sides; with a few concentric wrinkles. One inch and a half long. Inhabits the British coasts.

Genus 55.—MACTRINA.—*Brown.*

Generic Character.—Subtriangular, inequilateral; umbo prominent and obtuse; left valve with a strong triangular, slightly bifid tooth; with triangular transverse pits on each side, for the reception of two small depressed lateral teeth in the opposite valve, with a triangular pit between them; ligament external.

Mactrina triangularis.—THE TRIANGULAR MACTRINA. Plate XVIII. fig. 30. Strong, opaque, white; inside white, not very glossy; margin strongly crenated. Length, one-eighth of an inch. Inhabits the sea on the Dorsetshire and Kentish coasts.

Genus 56.—LUTRARIA.—*Lamarck.*

Generic Character.—Inequilateral, transversely oblong, or rounded, gaping at the extremities; hinge with one tooth, which is somewhat complicated, or two teeth, of which one is simple, with an adjoining deltoid hollow, which is oblique, and projecting internally; no lateral teeth; ligament internal, attached in a pit.

The want of lateral teeth, at once distinguishes the shells of this genus from those of Mactra.

Lutraria elliptica.—THE OVAL LUTRARIA. Plate XVIII. fig. 4. Oblong-oval, nearly smooth, having a few concentric, nearly obsolete wrinkles; and some diagonal striæ at the ends of the valves; of a fine yellow, or greenish-brown; inside white. Five inches broad. Inhabits the seas of Europe.

There are two sections in this genus.—* Shell transversely oblong. ** Shell orbicular.

SECTION IV. — CRASSIPEDES. — The mouth united in front, or partly so; foot thick, posterior; shell gaping when closed.

TRIBE I.—MYARIA.

Shells having a broad spoon-like tooth in each valve, or in one only; gaping at both extremities, or only at one end.

Genus 57.—ANATINA.—*Lamarck.*

Generic Character.—Transverse, subequivalve, gaping at both sides, or at one only; no cardinal teeth; one broad primary tooth in both valves, projecting interiorly; a lateral plate or rib running obliquely under the primary teeth.

Sometimes there is a fissure or suture extending from the apex, giving the appearance of a second plate or rib.

These shells form a connecting link between the Mactræ and Myæ.

Anatina declivis. — THE SLOPING ANATINA. Plate XVIII. fig. 5. Oval, thin, brittle, a little gaping near the end, where it is truncated, slightly wrinkled concentrically; yellow sand-colour. Two inches broad. Inhabits the British seas.

Genus 58.—MYA.—*Linnæus.*

Generic Character. — Transverse, gaping at both ends, with one large dilated projecting and nearly vertical primary tooth in the left valve, and with a hollow in the opposite valve; ligament internal, short, thick, and inserted in the hollow of the primary tooth on the one side, and in the pit of the other valve.

Mya truncata.—THE TRUNCATED MYA. Plate XVIII. fig. 6. Suboval, truncated, and gaping greatly at the smaller end; much rounded at the other; covered with a yellowish-brown epidermis; wrinkled transversely; inside white. Three inches broad. Inhabits the British coasts.

Genus 59.—GALEOMMA.—*Daudin.*

Generic Character.—Equivalve, inequilateral, transverse, with a large oval gape at the front margin; hinge without teeth, ligament internal.

Galeomma Turtoni.—TURTON'S GALEOMMA. Plate XV. fig. 8. Tumid in the middle, and gradually sloping to the sides; dull milk-white, covered with short interrupted opaque lines; beaks prominent and central. Breadth nearly an inch. Inhabits the English channel.

Genus 60.—MAGDALA.—*Leach.*

Generic Character.—Transversely oblong-ovate, gaping at one end; beaks obtuse; hinge without teeth, but provided with a transverse unconnected plate, attached to each valve by a cartilage and an oblique descending groove; cartilage internal.

Magdala striata. — THE STRIATED MAGDALA. Plate XVIII. fig. 12. Ovate-oblong, thin, pellucid, white; posterior side rounded and the anterior side truncated and gaping, with longitudinal striæ and concentric wrinkles; inside perlaceous. One inch broad. Inhabits the British seas.

Genus 61.—MYATELLA.—*Brown.*

Generic Character. — Sub-parallelogramical, transverse, anterior end truncated; the valves reflex, forming a hiatus; umbo small, placed nearest the posterior end; with one erect, broad, doubly channelled tooth in the left valve, which locks into a corresponding cavity in the other.

Myatella striata.—THE STRIATED MYATELLA. Plate XVI. figs. 12 and 30. Subpellucid, white, of a delicate texture, longitudinally striated; inside white, slightly reflecting a nacreous or iridescent hue. Length, half an inch; breadth, an inch. Inhabits the sea at Tenby in Wales.

Genus 62.—CRENELLA.—*Brown.*

Generic Character. — Oblong-ovate, equilateral, ventricose; beaks obtuse, slightly turned to one side; hinge without teeth, but with a flattened, slightly crenated plate in each valve; the right valve with a triangular, horizontal, projecting, reflexed plate, and the left one with an oblique plate, both of which are slightly crenated.

Crenella elliptica. — THE OVAL CRENELLA. Plate XVIII. fig. 13. Ovate, ventricose; with decussated striæ; greenish-yellow, inside nacred, the margins crenulated. One-eighth of an inch long. Inhabits the coasts of Zetland and Argyle.

Genus 63.—SPHENIA.—*Turton.*

Generic Character.—Transversely oblong-ovate; slightly tortuous; hinge without teeth, but with the cardinal margin flattened.

Sphenia Binghami.—BINGHAM'S SPHENIA. Plate XVIII. fig. 14. Upper valve flat, much smaller than the under, which is convex, and incurved at the extremity, and envelopes the smaller valve; covered with a reddish-brown epidermis; inside bluish-white. Half an inch broad. Inhabits the Devonshire coast.

The Spheniæ of Turton are very probably young shells of the genus Mya.

TRIBE II.—SOLENACEA.

Shells transversely elongated, destitute of accessory pieces, and gaping at the lateral extremities only; ligament external.

Genus 64.—GLYCIMERIS.—*Lamarck.*

Generic Character.—Transverse, gaping widely at each extremity; hinge callous, destitute of teeth; ligament external.

These shells are distinguished from Solen by having teeth at the hinge, and from Saxicava by the ligament being placed on the shortest side of the shell.

Glycimeris Siliqua.—THE POD GLYCIMERIS. Plate XVIII. fig. 7. Transversely oblong; covered with a black epidermis; umbones decorticated; internal disk of the valves white, callous, and thick. Two inches and a half broad. Inhabits the North seas.

Genus 65.—PANOPÆA.—*Lamarck.*

Generic Character.—Equivalve, transverse, gaping unequally at the sides; one conical primary tooth in one valve, and a compressed, short, ascending callosity on each side; ligament external, affixed on the elongated side of the shell, over the callosities.

The more prominent apices of the shells of this genus at once distinguish them from the Myæ.

Panopæa Aldrovandi.—ALDROVANDUS'S PANOPÆA.

Plate XVIII. figs. 8 and 9. Transversely elongated, undulated; concentrically wrinkled; of a yellow-fawn colour. Inhabits the Mediterranean.

Genus 66.—SOLEN.—*Linnæus.*

Generic Character.—Equivalve, transversely elongated, gaping at both extremities; beaks very small, always short; primary teeth small, varying in number, sometimes none, and rarely a pit between them; ligament external.

There are three sections in this genus:—* Shells with a terminal hinge; and anteriorly truncated. ** Primary teeth somewhat distant from the anterior margin. *** Hinge situated nearer the middle than the anterior end.

Solen Ensis.—THE SABRE SOLEN. Plate XVIII. fig. 11. Linear, sabre-shaped, somewhat reflected at the end next the hinge; in each valve a single compressed tooth without laminæ; olive-brown towards the base of the shell, and next the apex brownish-purple. From five to seven inches broad. Inhabits the seas of Europe.

TRIBE III.—PHOLADARIA.

Valves with accessory pieces; or widely gaping anteriorly.

Genus 67.—GASTROCHŒNA.—*Spengler.*

Generic Character.—Equivalve, somewhat wedge-shaped; with a very large, oval, oblique, anterior opening betwixt the valves, the posterior extremity nearly close; hinge linear, marginal, and without teeth.

Gastrochœna modiolina.—THE MODIOLIFORM GASTROCHŒNA. Plate XVIII. fig. 16. Oval, thin, brittle, gaping at the side; of a light reddish-brown; inside bluish-white. Three-fourths of an inch long. Inhabits the British coasts; boring into hard substances.

Genus 68.—PHOLAS.—*Linnæus.*

Generic Character.—Animal without a tubular sheath, projecting anteriorly into two united tubes, frequently surrounded by a common skin, and the posterior extremity provided with a very short muscular foot, blunt at the end. Shell bivalve, equivalve, transverse, gaping at both extremities, with various accessory pieces either on the hinge or below it; inferior margin of the valves inflected.

Pholas crispatus.—THE CURLED PHOLAS. Plate XVIII. fig. 17. Somewhat oval; reticulated on the anterior half, which separates from the plain wrinkled half by a broad furrow down the middle. Two inches long and three broad. Inhabits the British coasts.

TRIBE IV.—TUBICOLÆ.

Shell contained in a testaceous sheath distinct from its valves, or incrusted wholly or partly in the wall of this tube, or projecting outwards.

Genus 69.—TEREDO.—*Linnæus.*

Generic Character. — Animal much elongated, worm-shaped, invested by a testaceous tube, and boring into wood; with two anterior, projectile, short tubes, and two opercular processes, adhering to the sides of the tubes; with a posterior short muscle, protected by a bivalve shell. Tube testaceous, cylindrical, and tortuous, pervious at both extremities, and covering the animal. Shell bivalve, placed externally of the tube; each valve provided with a subulate piece within.

Teredo navalis.—THE SHIP TEREDO, or SHIP-WORM. Plate XVIII. figs. 18 to 22. Cylindrical, taper, smooth, white, somewhat flexuous, finely striated longitudinally. Inhabits the European seas, in timber.

Genus 70.—TEREDINA.—*Lamarck.*

Generic Character.—Tube testaceous, tubular, cylindrical, closed at the posterior extremity, but exhibiting the two valves of the shell; anterior extremity open.

Teredina personata.—THE MASKED TEREDINA. Plate XVIII. fig. 22. Shell consisting of a straight tube, with a club-shaped termination, the club consisting of several sinuses and lobes, and resembling a mask. Fossil from Courtagnon.

Genus 71.—SEPTARIA.—*Lamarck.*

Generic Character.—With a very long testaceous tube, gradually attenuated anteriorly, and appearing as if divided interiorly by vaulted unfinished partitions; anterior end of the tube terminated by two other slender tubes, which are not divided.

There can be no doubt but that the sheath encloses a bivalve, but as no perfect specimen has hitherto been found, the fact has not been authenticated.

Septaria arenaria.—THE SAND SEPTARIA. Plate XVIII. fig. 23. Tubular, tapering, terminating in a slender undivided tube. Found in sand on the shores of the Indian sea.

Genus 72.—FISTULANA.—*Lamarck.*

Generic Character.—With a tubular testaceous sheath, more tumid and closed behind, and attenuated at the anterior end; open at the summit, and containing an unattached bivalve shell; valves of the shell equal, and gaping when shut; animal provided with two tubular appendages in front.

Lamarck ascertained that the testaceous tubes were not the shells themselves, and that the attached bivalve was such.

Fistulana gregata.—THE GREGARIOUS FISTULANA. Plate XVIII. figs. 24 to 26. Sheaths club-shaped, aggregated;

the shells angularly arcuated, with double, angulated, serrated wings. Minute.

Genus 73.—CLAVAGELLA.—*Lamarck.*

Generic Character.—Sheath tubular, testaceous, attenuated and open before; terminating posteriorly in an oval, subcompressed club, roughened by spiniform tubes; club showing on one side a valve of the shell, attached to its walls; the other valve unattached, in the sheath.

Lamarck considers Clavagella as intermediate between Fistulana and Aspergillum, differing from the latter in having but one external fixed valve, the other being free and internal, and from the former in having no perforation at the larger extremity.

Clavagella aperta.—THE OPEN CLAVAGELLA. Plate XVIII. figs. 27 and 28. An erect tube, adhering to another body; with a funnel-shaped, expanding, entire, and waved aperture; provided with an ovate face-valve.

Genus 74.—ASPERGILLUM.—*Lamarck.*

Generic Character.—Sheath tubular, testaceous, attenuated towards the anterior termination, where it is open, and thickened posteriorly into a club, with the valve of the shell incrusted on its walls; club convex, with a terminal disk, perforated with scattered, somewhat tubular poles, and having a fissure in the centre.

Aspergillum Javanum.—THE JAVA ASPERGILLUM. Plate XVIII. fig. 29. Smooth, club-shaped, the terminal disk surrounded by fimbriated rays. Five inches long. Inhabits the Indian seas.

CLASS III.—CIRRIPEDA.

The animals are soft, destitute of head or eyes, covered with a shell, which is fixed to other substances, and incapable of locomotion. The body is reversed, inarticulated,

provided with a mantle, having tentacular, cirrous, many-jointed arms or feelers above.

The class Cirripeda is divided by Lamarck into two orders:—I. PEDUNCULATA. The body supported by a tubular moveable peduncle, the base of which is attached to extraneous substances in the ocean, such as stones, wood, &c.; the mouth is usually placed below.—II. SESSILIA. The body without a peduncle, and attached to extraneous substances; the mouth usually at the upper and anterior part of the body.

All the Cirripeda have their shells multivalve, or composed of a number of pieces.

ORDER I.—PEDUNCULATA.

Body supported on a tubular fleshy peduncle.

Genus 1.—OTION.—*Leach.*

Generic Character.—Body pedunculated, enveloped in a membranous tunic, which is ventricose above; two horn-like tubes, directed backwards, truncated, open at their points, and situated in the apex of the tunic; having a lateral opening, with many articulated and ciliated arms. Shell consisting of two small testaceous semilunar valves, attached near the lateral opening.

Otion Blainvillii.—BLAINVILLE'S OTION. Plate XIX. fig. 1. Ash-coloured; the body and horns spotted with black. Inhabits the North seas.

Genus 2.—CINERAS.—*Leach.*

Generic Character.—Body pedunculated, encased in a membranous tunic, which is swollen above, with an opening below the summit, from which protrude many ciliated, articulated arms. Shell having five testaceous, oblong, sepa-

rate valves, two of which are on the sides of the aperture, and the others dorsal.

Cineras aurita.—THE EARED CINERAS. Plate XIX. fig. 2. Greenish ash-colour, clouded and streaked with black; wrinkled towards the base. Inhabits the coast of England.

Genus 3.—POLLICIPES.—*Leach.*

Generic Character.—Body covered by a shell, and supported on a tubular, tendinous, scaly peduncle; with many tentacular arms. Shell compressed at the sides, with numerous separated unequal valves, thirteen or more in number; the lower side ones the smallest.

Pollicipes cornucopia.—THE CORNUCOPIA POLLICIPES. Plate XIX. fig. 3. Peduncle short, covered with imbricated scales, the base of the scales towards the bottom of the peduncle rounded, and pointing upwards. Inhabits the European seas.

Genus 4.—SCALPELLUM.—*Leach.*

Generic Character.—Body covered by a shell, and supported by a tubular, scaly peduncle; multivalve, but the valves never exceeding thirteen in number, concentrically striated, and frequently with a central pointed inclined knob.

Scalpellum vulgare.—THE COMMON SCALPELLUM. Plate XIX. fig. 4. Valves rough, the dorsal one compressed; covered with short hairs; peduncles short, annulated, and hairy. Inhabits the British seas.

Genus 5.—ANATIFA.—*Bruguiere.*

Generic Character.—Body covered with a shell, supported by a tubular tendinous peduncle; with long, numerous, and unequal tentacular arms, which are articulated and ciliated, and emanating from the summit on one side. Shell compressed on the sides, with five flat valves, the valves

contiguous and unequal; the lower lateral ones the largest; the whole of them united and kept together by means of thin membranes.

Anatifa lævis.—THE SMOOTH ANATIFA. Plate XIX. fig. 5. With five smooth valves; the dorsal valve rounded at the sides, and slightly carinated; peduncle very long, of a scarlet colour. Inhabits the British seas.

This and other species, popularly called Barnacles, were formerly supposed to give origin to ducks and geese, the filaments having been taken for feathers.

ORDER II.—SESSILIA.

Body without a peduncle, and enclosed in a multivalve shell, seated immediately on marine bodies, or rocks; mouth and tentacula placed in the apex, or upper part of the body.

* With a bivalve operculum.

Genus 1.—PYRGOMA.—*Savigny.*

Generic Character.—Sessile, univalve, subglobular, ventricose, convex above, and open at the apex; opening small, elliptical, provided with a bivalve operculum.

Pyrgoma crenata.—THE CRENATED PYRGOMA. Plate XIX. fig. 6. With radiated ribs, and crenated round the margins; of a pale violet colour.

Genus 2.—CREUSIA.—*Leach.*

Generic Character.—Body sessile, subglobular, enclosed in an operculated shell; having three or four pairs of tentacular arms. Shell sessile, fixed, orbicular, convexo-conical, consisting of four united unequal valves; operculum internal and bivalve.

Creusia verruca.—THE WARTED CREUSIA. Plate XIX. fig. 7. White, slightly depressed, with interlocked obliquely

striated valves; the margin at the base irregularly serrated. One-fourth of an inch broad. Inhabits the British seas.

** Opercula with four valves.

Genus 3.—ACASTA.—*Leach.*

Generic Character.—Shell sessile, ovate, subconic, compressed, and consisting of six lateral valves; two of the valves small, and four large, slightly united; having a cup-shaped plate, concave internally, at the base.

Acasta Montagui.—MONTAGU'S ACASTA. Plate XIX. figs. 8 and 9. Valves erect, triangular, acute, with muricated ascending spines. Inhabits the British seas

Genus 4.—ADNA.—*Leach.*

Generic Character.—Cup-shaped, sessile, shell composed of one piece; aperture lozenge-shaped; with four valves.

Adna Anglica.—THE ENGLISH ADNA. Plate XIX. fig. 28. Shell slightly ribbed; of a fine rose colour; operculum transversely striated. Inhabits the Devonshire coast, attached to Caryophyllia Anglica.

Genus 5.—BALANUS.—*Bruguiere.*

Generic Character.—Body sessile, enclosed in an operculated shell; arms numerous, placed in two rows, unequal, articulated, ciliated, each composed of two cirri, supported by a peduncle, and exsertile; mouth with four transverse and dentated jaws, and provided with four hairy palpi-like appendages. Shell sessile, conical, composed of six valves, locked together, closed at the base by a testaceous plate; aperture subtrigonal or elliptical; operculum internal, and consisting of four moveable valves.

Balanus candidus.—THE WHITE BALANUS. Plate XIX. figs. 10 and 11. White; valves nearly smooth; operculum strongly ridged transversely, with longitudinal, nearly obso-

lete striæ. Two inches broad at the base. Inhabits the Frith of Forth.

Genus 6.—CORONULA.—*Lamarck.*

Generic Character.—Body sessile, enveloped in a shell, with small setaceous and cirrous arms.—Shell sessile, suborbicular, conoid, or conically truncated at the extremities, with very thick walls, and interiorly hollowed in radiating cells; aperture regular, of a rounded oval, and interiorly funnel-shaped; operculum having four obtuse valves.

Coronula diadema. — THE CROWN CORONULA. Plate XIX. fig. 12. Somewhat compressed, with six prominent longitudinally ribbed valves; alternating with as many depressed transversely striated ones. Found attached to the skin of whales in the North seas.

Genus 7.—TUBICINELLA.—*Lamarck.*

Generic Character. — Body enclosed in a shell; with small setaceous and unequal cirri.—Shell univalve, tubular, straight, somewhat narrowed towards the base; surrounded with nearly equidistant transverse ribs; truncated at both ends, open at the top, and provided with an operculum, consisting of four valves; base closed by a membrane.

Tubicinella balænarum.—THE WHALE TUBICINELLA. Plate XIX. fig. 13. Tubular, with transverse ribs, and a ring-shaped margin; operculum bottle-shaped. Found buried in the fat of the skin of whales in the American seas,—the operculum, and a portion of the upper part of the tube only being visible.

The Cirripeda differ so much in structure from the Mollusca, that they form a perfectly distinct group, intermediate between them and the Crustacea, or perhaps more nearly allied to the latter. Although in this arrangement they are not included among the Articulata, it is obvious that they correspond with them to a great extent, as they have their arms or filaments jointed. Some testaceous shells occurring in that great division of the animal kingdom, it has been judged proper to give some account of them in the following pages.

DIVISION III.

ARTICULATA.

THE animals of this comprehensive division, have their bodies, or members, composed of segments or articulated rings, to which the muscles are attached, on their interior surface. This division contains five classes, namely, *Annulosa*, *Crustacea*, *Arachnidæ*, *Myriapoda*, and *Insecta*. It is in the first only that testaceous bodies, like those usually called shells, occur.

CLASS V.—ANNULOSA.

Bodies more or less elongated, soft, naked, or enclosed in a tube, consisting of a number of segments, and having red blood. It contains three orders.

ORDER I.—SEDENTARIA.

Animals protected by a testaceous tube, from which they never issue entirely; branchiæ placed at one extremity of the body, or near it.

TRIBE I.—SERPULACEA.

The branchiæ are either separate, or covered by an operculum; tube solid and testaceous.

Genus 1.—MAGILUS.—*Lamarck.*

Generic Character.—Shell with its base bent into a spiral form, oval, with four contiguous, convex volutions, the last of which is the largest, and prolonged into a straight waved tube, which is convex above, carinated beneath, subdepressed and plicated on the sides the plicæ lamellar close, waved, vertical, and thicker on the one side than on the other.

This shell is usually found imbedded in a species of Madrepore. The animal is unknown. Lamarck supposes that it must, in the first place occupy the spiral volutions, from which it removes totally, as necessity requires an extension of the tube and that when it quits one part, it must fill it up with calcareous matter.

Magilus antiquus. THE ANTIQUATED MAGILUS. Plate XIX. fig. 17 Tubular distorted, transversely wrinkled; of a pale yellowish-brown. Inhabits the sea at the isle of France.

Genus 2.—GALEOLARIA.—*Lamarck.*

Generic Character.—Body tubicolar, provided anteriorly with a testaceous operculum; tubes testaceous, very numerous, cylindrical, subangular, erect, waved, crowded, adhering by their base and open at the summit; aperture orbicular, terminating on the side by a spathulate process, with an orbicular operculum, having from five to nine testaceous pieces above, and all attached to one side.

Galeolaria recumbens.—THE RECUMBENT GALEOLARIA. Plate XIX. fig. 16. White, and existing in reclining congregated masses.

Genus 3.—VERMILIA.—*Lamarck.*

Generic Character.—Body tubicolar, elongated, and atten-

uated towards the posterior part, and provided towards the upper part with a simple, testaceous, orbicular operculum; tube testaceous, cylindrical, posteriorly narrowed, more or less twisted, and adhering by the side to marine substances; aperture round, and the margin frequently provided with from one to three denticles.

Shells attached by one side to marine bodies.

Vermilia triquetra.—THE TRIANGULAR VERMILIA. Plate XIX. fig. 18. White or reddish, rugged, variously twisted, and triangular; carinated along the back. Inhabits the coasts of Britain.

Genus 4.—SERPULA.—*Lamarçk.*

Generic Character.—Body tubicolar, elongated, depressed, and attenuated behind; segments numerous, and narrow; small bundles of awl-shaped bristles, in a single row on each side, and also hooked bristles; branchiæ terminal, fan-shaped, and deeply cleft into pinnated, or plumose finger-like divisions; mouth terminal, placed between the branchiæ, and surmounted by a pedicled infundi buliform, or club-shaped operculum; tube solid, testaceous, irregularly twisted, either grouped or solitary, fixed, with a rounded and terminal aperture.

Found solitary, or in groups curiously intertwined.

Serpula vermicularis. — THE VERMICULAR SERPULA. Plate XIX. fig. 14. White, cylindrical, tapering, rugged, variously curved and twisted. Inhabits the coasts of Britain.

Genus 5.—SPIRORBIS.—*Lamarck.*

Generic Character.—Body tubular, subcylindrical, posteriorly attenuated; six pinnated retractile branchiæ, in radiated expansions, at the anterior extremity; operculum placed between the branchiæ, pedicellate, peltate; tube testaceous, spirally twisted into an orbicular form or a horizon-

tal plane, depressed and adhering below. The aperture terminal and rounded or angular.

Spirorbis nautiloides.—THE NAUTILUS-SHAPED SPIRORBIS. Plate XIX. fig. 15. White, nautilus-shaped, transversely wrinkled. One-eighth of an inch in diameter. Inhabits the British coasts, on Algæ, &c.

TRIBE II.—AMPHITRITÆA.

Branchiæ not separate or covered by an operculum, and disposed anteriorly; tube membranous, or horny, and more or less arenaceous.

* With large branchiæ on tentacula.

Genus 6.—AMPHITRITE.—*Lamarck.*

Generic Character.—Body tubicolar, elongated, cylindrical, attenuated behind, with many annulated segments; a single row of setiferous papillæ; subulate, fasciculate bristles and hooked setæ; branchiæ in slender finger-shaped fasciculi, disposed like a fan, and spreading into a disk; two short subulate filaments inserted at the internal base of the branchiæ, between which is a terminal mouth; tube elongated, cylindrical, tapering towards the base, membranous or coriaceous, and generally naked.

Amphitrite ventilabrum.—THE FAN AMPHITRITE. Plate XIX. fig. 19. Tube tapering, incurved, and smooth; of a cream yellow colour. Inhabits the Mediterranean sea.

Genus 7.—TEREBELLA.—*Lamarck.*

Generic Character.—Body tubicolar, elongated, cylindrical, attenuated posteriorly, segments transverse, and subannulated; having a row of nodulous and setiferous papillæ on each side; with numerous filiform, twisted tentacula surrounding the mouth, and terminating in front of it; two rows of ramose branchiæ placed in a single row beneath the ten-

tacula; tube elongated, cylindrical, attenuated, and pointed at the base, membranous, consisting of agglutinated grains of sand and fragments of shells.

Terebella conchilega.—THE SHELLY TEREBELLA. Plate XIX. fig. 21. Tube covered with numerous fragments of broken shells agglutinated together; with three branchiæ on each side. Inhabits the coasts of Holland and Britain.

It is not a shell, properly so called, however, any more than the tube of the caddis worm.

** With short branchiæ; tentacula short or awanting.

Genus 8.—SABELLARIA.—*Lamarck.*

Generic Character.—Body tubicolar, subcylindrical, attenuated behind; with fasciculi of subulate bristles in a single row on each side, and spathulous bristles and transverse laminæ, bordered with hooked setæ; anterior extremity obliquely truncated, elliptical, surmounted by six rows of brilliant spangles, three rows on either side; mouth elongated, cleft, with two lips, situated under the internal spangles; branchiæ small, placed near the mouth; tubes numerous, congregated in a common mass, composed of grains of sand and fragments of shells, and having cup-shaped orifices.

Sabellaria crassissima.—THE THICKEST SABELLARIA. Plate XIX. fig. 22. Tubes long, thick, somewhat parallel, and contiguous; the openings nearly obsolete. Inhabits the coasts of France and England.

Genus 9.—PECTINARIA.—*Lamarck.*

Generic Character.—Body tubicolar, subcylindrical, attenuated behind, with a row of setiferous papillæ on either side; bristles short, fasciculated; broad, blunt, and oblique in front, with golden yellow very brilliant pectiniform plates; mouth elongated, with two lips, surrounded with numerous short tentacula; four pectinated exterior branchiæ, placed on the second and third segments of the body. Tube the

shape of a reversed cone, membranaceous or papyraceous; covered with sandy particles, and not adherent.

Pectinaria Belgica.—THE BELGIC PECTINARIA. Plate XIX. fig. 23. Tube inversely conical, membranaceous and covered with particles of sand. Inhabits the European seas.

TRIBE III.—MALDANIA.

With intermediate branchiæ; tube open at both ends.

Genus 10.—DENTALIUM.—*Linnæus.*

Generic Character.—Body tubicolar, conical, with the anterior extremity exsertile, and surrounded by a membranous ring; mouth terminal and naked. Tube testaceous, nearly regular, slightly bent, attenuated towards the posterior extremity, and open at both ends.

* Tubes having longitudinal ribs or striæ.

Dentalium elephantinum.—THE ELEPHANTINE DENTALIUM. Plate XIX. fig. 27. Green, slightly bent, with ten longitudinal ribs. Three or four inches long. Inhabits the Indian and European seas.

** Tubes smooth.

Dentalium Entalis.—THE TOOTH DENTALIUM. Plate XIX. fig. 26. White or yellowish, slightly curved, smooth, and tapering to a fine point. One and a half inch long. Inhabits the British seas.

Genus 11.—CŒCALIUM.—*Fleming.*
BROCHUS.—*Brown.*

Generic Character.—Animal unknown. Shell tapering, cylindrical, subarcuated, imperforate at the smaller end; aperture orbicular, placed at the large end.

Cœcalium Trachea.—THE TRACHEIFORM CŒCALIUM.

Plate XIX. fig. 25. Brown, regularly furrowed transversely. Fourth of an inch long. Inhabits the British seas.

Genus 12.—CORNUOIDES.—*Brown.*

Generic Character.—Animal unknown. Shell cylindrical, tapering, the smaller end spiral.

Cornuoides major.—THE GREATER CORNUOIDES. Plate XIX. fig. 23. White, smooth, and semitransparent. Length scarcely a line. Inhabits the sea at Sandwich.

Genus 13.—CLYMENE.—*Lamarck.*

Generic Character.—Body tubicolar, slender, and cylindrical, with a series of setiferous papillæ on either side; anterior extremity retuse, oblique, having a semicircular margin, protruding beyond the mouth; destitute of tentacula; posterior extremity dilated, orbicularly expanded, in a funnel shape; the margin with equally slit dentations. Tube slender, open at both extremities, and incrusted externally with grains of sand and fragments of shells.

TRIBE IV.—DORSALIA.

With branchiæ placed on the back, or disposed longitudinally along the body.

Genus 14.—SILIQUARIA.—*Lamarck.*

Generic Character.—Body tubicolar, but not well known. Shell tubular, irregularly contorted, posteriorly attenuated, sometimes spiral at the base, and open at the exterior end, with a longitudinal, subarticulated slit, which continues its whole length.

Siliquaria anguina.—THE SNAKE-LIKE SILIQUARIA. Plate XIX. fig. 24. Shell taper, undulating, with a longitudinal fissure; spiral at the extremity. Inhabits the Indian seas.

ORDER II.—ANTENNATA.

An antenniferous head, provided with eyes; and having a projectile proboscis frequently furnished with jaws; and setiferous papillæ, which are pediform and retractile; the branchiæ are longitudinally disposed.

SECTION I.—Branchiæ arranged in the form of complicated tufts or leaflets, or ramose, constantly large and apparent; without spines.

To this section belong the Aphroditæ, Nereidæ, Eunicæ, and Amphinomeæ; none of which are furnished with shells.

ORDER III.—APODA.

No feet, or retractile setiferous, pediform mammilles; no antenniferous head; branchiæ disposed longitudinally in the interior.

Hirudinea, and Echiurea.

ON THE STRUCTURE OF THE MOLLUSCA.

THE animal kingdom has been divided into four great sections, characterized by peculiarities of organization, and named *Vertebrata*, *Mollusca*, *Articulata*, and *Radiata*.

The VERTEBRATA are distinguished from the rest by having an internal skeleton, composed of bones articulated with each other, a brain and spinal marrow contained within a skull and vertebræ, together with five organs of sense, and an alimentary canal opening at the two extremities of the body, and placed below or before the great trunk of the nervous system. The Mollusca, Articulata, and Radiata, have no internal skeleton, distinctly defined brain, or spinal marrow. The ARTICULATA have the body and limbs divided into segments, or formed of pieces jointed together. The RADIATA have a more or less evident disposition of their organs, or of some of them, into a radiating form, so as to spread out from a common centre.

The MOLLUSCA, so named because generally of soft structure internally (*Animalia mollia*, soft animals), may be defined as follows:—Soft, symmetrical, inarticulated animals, enveloped in a muscular skin, or mantle, which is sometimes bare, but generally has attached to it, externally or internally, a calcareous part, or shell, of one or several pieces; with a complete twofold (or general and pulmonic) circulation of white (or at least not red) blood, contained in arteries and veins; respiration of water by branchiæ (or gills), or sometimes of air by a cavity on the walls of which

the pulmonary arteries are distributed; an alimentary canal with two apertures, and consisting of an œsophagus, one or several stomachs, and an elongated intestine; a nervous system composed of a cerebriform ganglion, placed under or surrounding the œsophagus, and communicating with the ganglia of the various functions. The organs of sense are generally little developed, those of touch or general sensation however being more perfect. In some, generation is effected by mutual impregnation, each individual of the species being hermaphrodite; in others, the sexes are separate, some individuals being male, others female; in others, each individual is bisexual, and produces eggs or young without communicating with another individual. Some are viviparous, but by far the greater number oviparous.

Those Mollusca which are most highly organized approach more nearly in structure to the Vertebrata than any other invertebrate animals. Yet there is a wide separation between these two great divisions; for the mode of structure of the most imperfect fish differs essentially from that of the most perfect molluscous animal.

Many systems or methods of arrangement have been proposed by authors for classifying the Mollusca. Although zoology has made vast progress of late years, it is not yet so far advanced as to possess general classifications of the different series of animals admitted to be correct by all or most of those engaged in the examination of some of the various groups. The system of Linnæus, once generally adopted, was soon found to be insufficient, it not having been based upon an extensive and accurate knowledge of the structure and relations of animals. That of Cuvier, not many years ago nearly as general as that of Linnæus formerly was, is also daily undergoing modifications. In each particular branch, as of birds, for example, or reptiles, every author has a system of arrangement of his own. This want of agreement is the necessary result of the imperfect state of our knowledge, and must continue until natural objects be completely investigated and understood. Any attempt to bind the public to any particular system in any depart-

ment of natural history must, therefore, be more or less injurious; but the adoption of even a very imperfect system by an individual, is preferable to having no system at all. It is evident that an arrangement which refers only to some particular organs or parts of animals cannot afford a correct idea of their nature, and that a rational system must have reference to all their organs. Conchological systems, having reference merely to shells, are of this imperfect kind; for shells are not animals, but parts, and not even essential parts, of animals. A slug, which is destitute of a shell, or at least of an external shell, is most closely related to a snail, which has a shell; and there are very numerous marine naked, slug-like Mollusca, which cannot be separated from similar species furnished with shells. He who would know the nature of shells, must know first the nature of the animals of which shells form a part.

According to many modern authors, the Mollusca may be conveniently arranged into six classes, of which three have the head distinct, or more or less obvious, while in the other three it is not apparent, or not well defined.

Mollusca having the head distinct.

I. Cephalopoda. The body enclosed in a bag formed by the mantle, from which projects the head, surrounded by filaments or arms, which are at once organs of prehension and locomotion. Fig. 1.

II. Pteropoda. The body not enclosed in a bag, nor the head surrounded by filaments; but the sides of the neck furnished with membranous appendages, like wings or fins. Fig. 2.

III. Gasteropoda. None of the characters of the preceding classes; but at the lower surface ot the body a fleshy contractile and expansile mass, or foot, enabling the animal to crawl or swim. Figs. 3 and 4.

Mollusca destitute of a distinct head.

IV. Acephala. Four thin expanded branchiæ distinct

from the mantle, and almost always a compressed fleshy foot. Fig. 5.

V. Brachiopoda. Branchiæ not distinct from the mantle; two ciliated filiaments or arms in place of a foot. Fig. 6.

VI. Tunicata. The body enclosed in a cartilaginous bag; branchiæ not distinct; no special organs of motion. Fig. 7.

In this arrangement, the general form of the body of these animals, being in relation with the greater or less complexity of their internal organization, is assumed as a basis. Thus, some have a distinct head, figs. 1, 2, 3, 4, 8; while in others there is no such part separated or distinguishable from the rest, figs. 5, 6, 7, 9. Among the Mollusca furnished with a head, there are some, the *Cephalopoda*, fig. 1, which have around the mouth long appendages subservient to locomotion; others, the *Pteropoda*, fig. 2, have wing-like appendages or fins on the two sides of the body; and in others, the *Gasteropoda*, fig. 3, the lower part of the body forms a kind of muscular foot, by which the animal crawls. Of the Mollusca of which the head is not distinct, some, the *Acephala*, or *Acephala Lamellibranchiata*, fig. 9, have the respiratory organs in the form of four thin plates, two on each side, within the mantle, and not adherent to it; others, the *Brachiopoda*, fig. 6, have two twisted and ciliated appendages or arms; and others, the *Tunicata*, fig. 7, have no organs of motion, but are shut up in a leathery covering or bag.

The general features or characters of the Mollusca given above, may now be a little more particularly described.

Their nervous system is composed of nervous filaments connected with a small number of ganglia, or little nervous masses, fig. 9, *r s*, dispersed in different parts of the body. The principal mass formed by these ganglia, which may be compared to the brain in the higher animals, fig. 8, *p*, is placed transversely over the œsophagus, or gullet, which it envelopes with a nervous ring or collar. But there is nothing in the Mollusca that can be compared to the spinal marrow, which in the vertebrated animals is cased in an

elongated tube formed by the vertebræ, or bones of the neck, back, loins, and sacrum. The organs of sense are always less perfect than in the Vertebrata, but differ extremely in the various groups. Some Mollusca appear to have only the senses of touch and taste; but in a great number there are eyes, fig. 1, *e;* fig. 3, *d;* of which the structure varies; in a few only there are organs of hearing; but in none of them has a particular organ for smell been proved to exist, although many of them appear to have the faculty of smelling, which perhaps is exercised by the whole surface of the body.

There being neither an internal jointed skeleton, as in the Vertebrata, nor an external skeleton, composed of hard jointed pieces or rings, as in the Articulata, the muscles are attached to different points of the skin, and act only upon the parts on which they are inserted, so that it is only by the elongation and contraction of certain parts that they crawl or swim, and their movements are generally slow, and not characterized by the precision observed in the higher animals, or in insects. They never have feet arranged in series on each side of the body, as in the Vertebrata and Articulata; and it is only in a few of them that there are elongated and flexile organs intended for locomotion.

Their blood is white, bluish, or limpid, and circulates in a very complex vascular apparatus, composed of arteries and veins. The circulation is always double; that is, the blood passes through two sets of capillary vessels, one set distributed in all parts of the body, the other belonging to the respiratory apparatus. The heart, fig. 9, *l*, formed of a ventricle and one or two auricles, receives the blood which comes from the respiratory system, and impels it into the arteries which distribute it to the various parts of the body. Sometimes there are seen at the base of the pulmonary arteries bags which receive the venous blood, and which some have erroneously considered as so many hearts, they being only receptacles, and not having the power of impelling the blood.

The respiratory organs vary in their form and structure,

being generally adapted for receiving water, but sometimes air. In the former case they somewhat resemble the gills of fishes, and are named branchiæ, fig. 9, *q;* in the latter, they are cavities, on the walls of which the blood vessels are distributed.

Their digestive apparatus consists of a mouth, fig. 9, *e*, an œsophagus, a stomach, fig. 9, *g*, or several stomachs, and an intestine, fig. 9, *i*. Sometimes the mouth is furnished with jaws, or horny teeth, but frequently has no organs of this nature. In general there are salivary glands, fig. 8, *q*, and all the species have a very large liver, fig. 9, *j*. Several of these animals secrete variously coloured fluids, such, for example, as the ink of the cuttle-fish.

Almost all the Mollusca have a development of the skin, which covers the body, and may be likened to a *mantle*, which is the name usually given to it, fig. 1, *a b;* fig. 7. Those of which the mantle is bare and fleshy are called *naked* Mollusca. More frequently, however, there is formed in its substance, or at its surface, a deposition of hard calcareous or horny matter, which constitutes a shell; and the Mollusca which are protected by a covering of this kind are called *testaceous.*

Shells increase in size by the deposition of new layers internally upon those already formed. Each new layer extends more or less beyond the margins of the layer to which it is applied, so that as the animal becomes older, its shell becomes larger and thicker. The outer surface is generally covered by a thin layer of membranous or horny matter named the *epidermis,* and the inner surface is often covered with a layer of a pearly nature. The form of shells varies much: sometimes they resemble a shield, which covers the back of the animal, as in the limpet; at other times they constitute a tube twisted upon itself, as in snails; and frequently also they are composed of two plates, united by a hinge, as in mussels and oysters.

The Mollusca originate from eggs; but sometimes the eggs are hatched after being laid, and sometimes before, the young in this case being born alive. In all cases, these

animals when first produced have nearly the same form as they are to retain, and are not subject to metamorphoses, or changes like those undergone by insects.

As the organs are modified in the different classes, it may now be well to present the principal characters of these groups.

CLASS I.—CEPHALOPODA.

The class of Cephalopodous Mollusca is composed of animals of very singular form, fig. 1. Their trunk or body, generally rounded, is enclosed in the mantle, which has the form of a bag, sometimes nearly spherical or oval, sometimes elongated, fig. 1, *a b;* their head, fig. 1, *d*, is large, and crowned with fleshy arms or appendages, fig. 1, *f g;* subservient to locomotion, as well as prehension; so that when they crawl, it is with the head below, and the body above. They are divided into two families: the *Dibranchial*, and the *Tetrabranchial.*

The Dibranchial, or Ordinary Cephalopoda, have the most complex organization of all the Mollusca. Their head is round, and furnished with two large eyes, similar in structure to those of the vertebrated animals. They have also a small auditory apparatus. Their mouth is armed with two strong horny jaws or mandibles, like a parrot's or hawk's bill; and around it are disposed in a circle, long, tapering, fleshy bodies, fig. 1, *f g*, capable of being moved in any direction, muscular and vigorous, and furnished with cup-like bodies, by which they can be very firmly affixed to objects on which they lay hold. The rest of their body is contained in a kind of rounded bag, fig. 1, *a b*, formed by the mantle, or fleshy skin.

These animals are all inhabitants of the sea, and respire by means of branchiæ placed on each side of the body, at

the bottom of the bag formed by the mantle. The water which issues from this cavity escapes through a funnel placed at the lower part of the neck, and also serving for the expulsion of the excrements. There are two branchiæ, and at the base of each of these organs is a kind of pulmonic heart, and at the commencement of the great artery of the body an aortic heart, which is composed of a ventricle only. Their stomach is very complex. They secrete a peculiar fluid, of a very dark colour, called *ink*, which they can expel at will, and which they are said to employ to tinge the water around them, when they wish to conceal themselves.

These Cephalopoda are extremely voracious, and as they are possessed of activity and great strength, and have numerous means of seizing their prey, they are very destructive to fishes and crustacea. Several are remarkable for the manner in which their skin is covered with variously coloured spots, which alternately appear and disappear. To this group belong the Cuttle-fishes, Argonauts, and others.

The *Octopi* have eight nearly equal arms, of great length and vigour, by means of which they clasp their prey. Some authors think that china-ink is made of the black fluid of a species of cuttle-fish, but others are of a different opinion.

The *Argonauts* are very similar to the cuttle-fishes, but have two of their arms much widened toward the end, and live in a large convoluted shell, remarkable for its delicate texture and beauty. Some naturalists think that they do not themselves form these shells, but are merely parasites which take possession of them, after the unknown inhabitants have been destroyed, in the same manner as the hermit crab lodges in other shells.

The *Cuttle-fishes*, fig. 1, differ from the octopi and argonauts in having their body more elongated and furnished with two fins, or, fig. 1, *b b*, fleshy expansions projecting on either side longitudinally; and ten arms, of which two are much longer than the rest. They have also in the interior of their body a kind of oval shell, composed of a multitude of thin laminæ of calcareous matter, and which is employed in the arts, under the name of cuttle or cuttle-bone.

The *Calmaries* have the body much elongated and furnished with two terminal fins. Their internal shell is horny; but they have ten arms, two of them more elongated, like the cuttle-fishes, which they otherwise resemble in structure.

The TETRABRANCHIAL CEPHALOPODA differ from those spoken of, in having four in place of two branchiæ, and in their tentacula or arms being destitute of cups. Their body is contained in the last cell of a large spirally convolute shell, divided by transverse partitions into several cavities or cells. Each of these partitions is perforated by a hole, and the tube or siphon thus formed extends to the posterior extremity or apex of the shell, and is lined by a membranous contractile tube posterior to the body of the animal. The siphon communicates with an external reservoir, and can be distended with fluid, or emptied, so that the air which occupies the cells may be compressed or dilated, and thus increase or diminish the specific gravity of the animal. The Pearly Nautilus is the type of this group of animals, to which also belongs the Ammonite family.

CLASS II.—PTEROPODA.

The Pteropodous Mollusca, fig. 2, are small marine animals organized for swimming, they having no organ by means of which they can crawl, or even fix themselves to objects. Their body is generally contained in part in a small shell, fig. 2, *a*, but sometimes it is naked, and their neck is furnished with two thin expansions resembling wings, fig. 2, *b b*. The Hyale, for example, is of this kind. These animals abound in the seas of warm climates; to which, however, the species are not restricted; for some of them, as *Clio borealis*, are so numerous in the arctic seas, as at certain seasons to furnish whales with their ordinary food.

CLASS III.—GASTEROPODA.

The Gasteropodous Mollusca, figs. 3, 4, are distinguished by having a fleshy foot or disk attached to the lower part of the body, sometimes, as in slugs, to its whole length, but more frequently only to its anterior part. One may form a correct enough idea of the general form of all the Gasteropoda by examining a slug or a snail. Their body is elongated, and terminated anteriorly by a head, fig. 3, *e*, which projects beyond the mantle, and usually bears two or four retractile tentacula, fig. 3, *c c*, inserted above the mouth, and very small eyes, fig. 3, *d*, of a very simple structure. Their body is covered beneath by a fleshy mass, fig. 3, *f*; fig. 4, *g g*, which generally presents the form of a broad disk, and is the instrument by which the animal crawls along the ground, but which sometimes constitutes a vertical fin. Their back is furnished with a mantle, which is sometimes bare, but generally covered by a shell. In most cases, the shell is large enough to contain the animal entirely, when it contracts itself, and it generally has the form of a tube twisted upon itself. In many species a horny or calcareous plate, called the operculum, is attached to the foot behind, fig. 4, *h*; fig. 8, *b*, and serves to close the aperture of the shell, when the animal has withdrawn.

The organs of respiration are sometimes adapted for air, more frequently for water; but in those species which have a twisted shell, they are always lodged in the last or body convolution, and receive the ambient element either by a hole in the mantle, or by a wide opening between the body and the mantle, which is also sometimes prolonged into a canal or tube, by means of which the animal can respire without protruding either its head or its foot. In this latter case, the shell has a notch or canal, for the respiratory tube, situated at the fore part of the aperture of the shell, near the end of the columella.

The heart, fig. 8, *j*, is usually composed of an auricle and a ventricle, and, as in the other Mollusca, receives the arterial blood coming from the organs of respiration. The mouth is surrounded by contractile lips, and sometimes armed with horny teeth fixed to the palate, or with a fleshy proboscis, fig. 4, *e*. The stomach, liver, and other viscera, are lodged beneath the mantle, and generally contained within the shell. The intestine, fig. 8, *m*, almost always ends on the right side of the body.

In this class, the organs of sense are less developed than in the Cephalopoda. The tentacula are organs of touch, and perhaps of smell also. They have no special organ of hearing. Their eyes, sometimes placed on the head, sometimes at the base of the tentacula, on their sides, or at their tips, are always very small and simple, or sometimes wanting.

Their food is various; some are terrestrial, others live in fresh water, but the greater number in the sea. They form the most numerous class of the Mollusca, and species of them occur in all countries.

The Gasteropodous Mollusca may be arranged into several orders, respecting which there is much diversity of opinion, and, as in every department of zoology, a great difference of nomenclature. The orders proposed by Cuvier, and adopted by many, are:—*Pulmonata*, *Pectinibranchiata*, *Tubulibranchiata*, *Scutibranchiata*, *Tectibranchiata*, *Cyclobranchiata*, *Inferobranchiata*, *Nudibranchiata*, *Heteropoda*, and *Cirrobranchiata*.

ORDER I.—GASTEROPODA PULMONATA.

The Gasteropoda which respire air differ from the rest in having, in place of branchiæ, a cavity on the back, or a kind of lung, formed by a membranous bag, furnished internally with a complex network formed by the pulmonary vessels, and opening externally by a hole in the edge of the mantle,

over the neck, on the right side. They all live on vegetable substances. Some are terrestrial, others aquatic.

The *Terrestrial Pulmonated Gasteropodous* Mollusca have the head furnished with four retractile tentacula, of which the upper two are longer, and bear the eyes at their tips. The mouth is armed with a palatal tooth, and a small tongue covered with minute prominences. The body varies in form, and some are naked, or provided only with an internal shell, while others have an external spiral shell, of which the apex is obtuse, and the aperture entire before. The naked species constitute the genera *Arion*, *Limax*, *Vaginula*, *Parmacella*, and others. Those having an external shell are, *Vitrina*, *Bulimus*, *Pupa*, *Vertigo*, *Succinea*, *Achatina*, *Helix*, and others.

The slugs, *Limacina*, are terrestrial pulmonated Gasteropoda destitute of external shell. Their body is elongated, and they have for mantle a fleshy disk, which is hardly separated from the rest of the skin, and occupies the forepart of the back. They are herbivorous, feeding chiefly on young plants, fruits, and mushrooms. It is in the evening, or after rain that they are most active, and during the day they remain concealed in holes, under stones or dead leaves, or even in the ground. During winter they remain torpid, in holes or crevices, or buried in the earth.

The snails, *Helicina*, have a convoluted shell, sometimes flattened, sometimes globose, with a roundish or crescent-shaped aperture. They differ little in their organization from the slugs; only the mantle, in place of forming a convex scutum, constitutes a large cone, twisted upon itself, and covered by the shell. In summer and autumn, they are very voracious, but toward the end of the latter season they eat little, and, at the approach of winter, they retire to a suitable place, withdraw within the shell, close its aperture with membranous layers, and remain torpid until the warm weather in spring excites them to activity. These Mollusca have the power not only of repairing their shells when broken or crushed, but even of reproducing their tentacula and large portions of the body when removed by accident or for experi-

ment. They are very numerous, and species occur in all climates. Nearly allied to the Helicina are the *Bulimi*, *Pupæ*, *Succineæ*, *Clausiliæ*, and other genera, forming several natural families.

The *Aquatic Pulmonated Gasteropoda*, although they live in the water, respire air, for which they come occasionally to the surface. They have only two tentacula, the terrestrial species having four. Among them are the *Planorbes*, of which the tentacula are very slender, and the shell presents the appearance of a flat disk, the turns being rolled up in the same plane; the *Limnæi*, which have the shell oval or oblong, and the tentacula flattened and triangular; the *Physæ*, similar to the Limnæi, but with the lobes of the mantle capable of covering part of the shell, which is extremely thin; and the *Auriculæ*, of an oval or oblong form, with the columella strongly plaited or toothed.

ORDER II.—GASTEROPODA PECTINIBRANCHIATA.

This division of the Gasteropoda, the most numerous in genera and species, is characterized by having a branchial cavity, in which are disposed one or two branchiæ, having the form of membranous laminæ arranged in series. This cavity is placed on the back, occupies the last or largest turn of the shell, and opens externally by a large slit situated between the body and the edge of the mantle. The shell is almost always spirally twisted, as in the snails; their head is furnished with two tentacula, and two eyes, supported sometimes on tubercles; and their mouth is in the form of a proboscis. In some there is a prolongation of the mantle in the form of a canal, and named the siphon, by means of which the animal can respire without emerging from the shell. In those species which have a siphon, there is a corresponding canal at the forepart of the aperture of the shell.

This order is extremely numerous, and comprehends the families of the *Turbonina*, *Trochina*, *Cyclostomina*, *Neritina*, *Buccinina*, *Fusina*, *Muricina*, *Volutina*, *Cypræina*, and others.

The *Trochina*, which are destitute of respiratory siphon, have a spiral shell of a conical form, with the aperture entire, closed by an operculum, and somewhat quadrangular. They are represented by the genus *Trochus*.

The *Turbonina*, to which belong the genera *Turbo*, *Littorina*, and others, have the shell globose, oval, or oblong, with the aperture completed internally by the penultimate turn. They have two long tapering tentacula, bearing the eyes at their base externally. On the sides of the foot are membranous expansions, sometimes simple, sometimes fringed. Their operculum is sometimes horny, sometimes calcareous, or extremely thick.

The *Cyclostomina* differ from the rest in respiring air, and in not having branchial organs in their respiratory cavities, but are otherwise so nearly allied to the families of this order, that they cannot well be separated from them. The aperture of the shell is round, margined, and closed by a thin circular operculum. They are terrestrial, and live in woods, among moss, or under stones.

The *Valvatina* have a shell somewhat resembling that of the Planorbes, but with a circular aperture, furnished with an operculum.

The *Paludinina*, which resemble the Cyclostomina, have the aperture of the shell thin-edged, and are furnished with branchiæ for respiring water.

The *Phasianellæ*, *Ampullariæ*, and *Melaniæ*, which live chiefly in warm climates, are nearly allied to the Turbonina.

The *Ianthinæ*, of which the shell somewhat resembles that of a snail, differ from the animals spoken of above, in having no operculum, and in being furnished with a vesicular organ under the foot, resembling a water-bubble, and which prevents the animal from crawling, but enables it to float. The common species, *Ianthina fragilis*, on being touched,

emits a fluid of a deep purple colour, which tinges the water around it.

The *Neritina* have the columella straight, which renders the aperture of the shell semicircular. To this family may be referred the *Naticæ*, of which the structure of the foot is peculiar, it being composed of two disks meeting at an acute angle, and the *Neritæ*.

The families which follow are all furnished with a respiratory siphon.

The *Buccinina* have an oval or elongated shell, with an oval aperture, and a notch at its forepart. The foot is generally of moderate size and rounded before, the mantle entire on the margin, and prolonged anteriorly into a canal, the mouth armed with a proboscis. Of this kind is the genus *Buccinum*, from which *Nassa* differs chiefly in having the columella covered with a thick plate of calcareous matter. The *Dolia* belong to the same tribe, and are remarkable for the length of their proboscis, and the great size of the foot. The *Harpæ* have the foot abrupt before, very large, and tapering to a point behind. The genera *Purpura*, *Cassis*, *Terebra*, and *Cerithium*, differing greatly in the form of the shell, and considerably in the structure of the animal, may be considered as part of the same series.

The *Muricina* have the aperture of the shell always prolonged into a canal generally of great length. The animals, however, greatly resemble those of the Buccinina. They have a proboscis, and the right edge of the mantle furnished with lobes or filaments. They are all carnivorous, and inhabit the sea. The *Murices* are distinguished by their shell, of which the canal is long and straight, and the turns furnished with transverse ridges or varices, often presenting spines or lamellæ, which are frequently branched or frondose. The *Fusi* have the canal also long, but they are destitute of varices. The *Strombi* have the outer edge of the aperture extremely dilated when old. In the *Pterocerœ* it is divided into long processes.

The *Volutina* have the columella furnished with oblique plaits. To this tribe belong the *Volutes*, *Mitræ*, and *Olivæ*.

In the *Cypræina*, the aperture is extremely narrow, and bordered with plaits or teeth on both sides. The *Ovulæ* are similar, but with teeth only on one side of the aperture.

The *Cones* have the shell of an obconical form, and the aperture very narrow, without plaits or teeth.

Many of the Pectinibranchiata have shells in the form of a shield, cup, or hollow cone, and have been called *Cupaloid*. Of this kind are the genera *Pileopsis*, of a conical form, with the apex a little spiral; *Crepidula*, of an oval form, with the aperture half closed by a horizontal plate, which supports the abdominal sac, and is covered beneath by the foot; *Calyptræa*, having in the hollow of their conical shell, a small projecting lamina, looking like the commencement of a columella; *Sigaretus*, in which the shell is concealed by the mantle, the aperture very large, and the spire small.

ORDER III.—GASTEROPODA TUBULIBRANCHIATA.

The Tubulibranchiate Gasteropoda have a great resemblance to the Pectinibranchiate species, but are distinguished by very important differences in their organization, as well as by their shell, which is fixed to submarine bodies, and has the form of a more or less irregular tube, of which the commencement only is spirally bent. *Vermetus*, *Magilus*, and *Siliquaria*, belong to this order.

ORDER IV.—GASTEROPODA SCUTIBRANCHIATA.

The animals of this order have the shell very widely open, more or less scutiform, and covering the branchiæ, or even the whole body. In *Haliotis*, the shell is slightly convoluted, with the spire very small and flattened, the aperture excessively large. Along the columella is a series of holes by

which the water arrives at a slit in the right side of the mantle, and penetrates into the branchial cavity. Round the foot is a double membrane cut into laminæ and furnished with long filaments. *Fissurella* has a shell like that of a limpet, but with a hole in the top, which affords passage to the water necessary for respiration, as well as to the fæces.

The *Emarginulæ* present in front a notch or slit, for the same purpose.

ORDER V.—GASTEROPODA CYCLOBRANCHIATA.

The Cyclobranchiata are very nearly allied to the Scutibranchiata; but are distinguished by having their branchiæ fixed beneath the edges of the mantle. The *Patellina* are furnished with a conical shell, which covers the whole body. They have two pointed tentacula, bearing the eyes at their base; a short proboscis, and a circular series of respiratory lamellæ between the mantle and the foot. The *Chitonina* differ from all other Mollusca in having an oblong depressed shell, composed of eight plates, kept together by ligaments, and cased in a thick margin. A membranous veil over the mouth answers for tentacula; and the branchiæ, composed of triangular lamellæ, are placed under the margin of the mantle.

ORDER VI.—GASTEROPODA INFEROBRANCHIATA.

The Inferobranchiata, which are very few, are naked Mollusca, having their branchiæ composed of a long series of laminæ, and placed on the two sides of the body, between the foot and the edge of the mantle. They differ from the Cyclobranchiata not only in being destitute of shell, but also in some points of their internal structure. The *Phyl-*

lidia, having the head furnished with four tentacula, and the arms on the hind-part of the mantle; and the *Diphyllidia*, having on each side of the head a pointed tentaculum and a slight tubercle, and the anus on the right side; both having the body oval, or more or less tubercular, belong to this group.

ORDER VII.—GASTEROPODA TECTIBRANCHIATA.

The Tectibranchiate Gasteropoda are also marine Mollusca, but have the branchiæ unsymmetrical, and composed of more or less divided laminæ attached along the right side or on the back, and more or less covèred by the mantle, which almost always contains in its substance a small shell. To this order belong the *Pleurobranchi*, of an oval form, with the branchiæ fixed on the right side, in a groove between the mantle and the foot, a proboscidiform mouth, surmounted by a small triangular veil, and two tentacula, four stomachs, of which the second is sometimes armed with bony pieces, and the anus behind the branchiæ; the *Aplysiæ*, which resemble slugs, but with the edges of the foot raised up in the form of flexible crests, a long neck, four tentacula, of which the upper are hollowed like the ears of a quadruped, and placed above the eyes; the *Dollabellæ*, which differ from the Aplysiæ only in having the branchiæ and mantle at the posterior extremity of the body; and the *Acera* or *Bullæ*, which resemble the Aplysiæ in having the stomach armed with a bony piece, but are distinguished by their tentacula, which are short, broad, and disposed so as to form a large fleshy shield over the eyes, some of them, the *Aceræ*, being naked; others, the *Bullæ*, covered with a shell.

ORDER VIII.—GASTEROPODA NUDIBRANCHIATA.

All the Mollusca of this order are destitute of a shell, and bear branchiæ seated on some part of the back. They are all marine, and have a general resemblance to slugs. Of the families which belong to this order may be mentioned: the *Æolidina*, having the branchiæ in the form of shreds, cirri, or papillæ, disposed along the sides, and two pairs of tentacula; the *Tritoniina*, with the branchiæ in the form of arbuscules or papillæ disposed along the sides, and two retractile tentacula; the *Dorina*, with four tentacula, the branchiæ tufted, and disposed in a circular form at the hind-part of the body above.

ORDER IX.—GASTEROPODA HETEROPODA.

The Heteropoda are not formed for crawling, as all the preceding orders are, but for swimming. Their foot is compressed into a vertical membranous plate, which they use as a fin. Their body is formed of a gelatinous, transparent substance, and their branchiæ are placed on the hind-part of the back. Of this kind are the *Carinariæ*, of which some of the organs are covered by a thin, transparent, conical shell, having the apex curved backwards; and the *Firolæ*, which have no shell, but otherwise resemble the Carinariæ.

ORDER X.—GASTEROPODA CIRROBRANCHIATA.

The Cirrobranchiate Gasteropoda have the respiratory apparatus composed of tufts of tentacular filaments situated on the sides of the neck. Such is the family of the *Den-*

taliina, in which the animal is much elongated, conical, and covered with a conico-tubular shell, open at both ends.

CLASS IV.—ACEPHALA, OR LAMELLIBRANCHIATA.

The great class of Mollusca known by the names of Lamellibranchiata, derived from the form of their respiratory organs, or Tropiopoda, from the compressed form of the foot, are readily known by their having a shell formed of two valves, connected by a hinge, fig. 5. The animals of this class are of a compressed form, with the head not distinct; the mouth, fig. 9, *e*, situated anteriorly, between two pairs of flattened labial appendages, fig. 9, *f*; the œsophagus, fig. 9, *e*, generally short; the stomach pyriform, fig. 9, *g*; the intestine, fig. 9, *i*, convoluted within; the liver and ovary, fig. 9, *j*; the circulatory apparatus a ventricle and an arterial system, and a venous system with two auricles; two pairs of laminiform transversely striated branchiæ, fig. 9, *q*, situated, a pair on each side, between the mantle and the body. The nervous system, fig. 9, *r s*, is very simple; there being no cerebral mass, or head; nor any organs of sense, besides those of taste and touch. Continuous with the lower part of the body is a compressed muscular foot, fig. 9, *k*, not capable of being used for crawling. The mantle, fig. 9, *b b* is very large, thin, laminiform, induplicate, and enclosing the body. There are generally two tubes behind, fig. 9, *o p*, one for allowing a passage to the water, *p*, the other for the expulsion of the excrement, *o*. These tubes are often united with a common envelope, fig. 5, *b*. The shell consists of two valves, covering the mantle, and having at its upper part an elastic ligament, which throws them open, when the adductor muscles, of which there are two, generally distant

but sometimes approximated so as to seem single, are relaxed. All the species are aquatic, some residing in fresh water, but the greater number in the sea. They feed on organic particles carried to the mouth by the water through the lower siphon. Their generative system consists of an ovary enveloped in the visceral mass, and the individuals do not impregnate each other.

This class may be divided into several great families; but the species are so nearly allied in structure that it has not been found expedient to arrange them into orders.

The *Ostracea* have no foot, or a very small one, and for the most part live fixed to submarine bodies, either by the shell, or by their byssus; their mantle is open behind as well as before, and its two lobes nowhere unite to form particular apertures, as is the case with all the other Lamellibranchiata. Some of them have a single adductor muscle, while others have two.

Among the former are the *Ostreæ*, or oysters, having a coarse laminated shell; and the *Pectines*, or clams, having a divergently ribbed shell. To the bimuscular series belong the *Meleagrinæ*, or pearl-oysters, and several other genera.

The *Mytilina* have the mantle open beneath, coherent behind, forming a single orifice; the foot slender, tongue-shaped, with a byssus at its base behind; the shell regular, equivalve, very inequilateral. To this family belong the genera *Mytilus*, *Modiola*, *Pinna*, and others.

The *Unionina* have the mantle open beneath, coherent behind, forming two orifices, the lower incomplete and barbate; the foot large; the shell regular, equivalve, inequilateral, with a strong epidermis. They are fresh water animals. *Unio*, *Alasmodon*, *Anodon*.

The *Arcina* have the mantle open in its whole length, and destitute of tubes; the foot very short, thick, and truncated; the shell equivalve, inequilateral, with numerous small teeth along the hinge. *Arca*, *Nucula*, *Pectunculus*.

The *Chamacea* have the mantle closed, with three apertures, one for the foot, the two posterior for respiration and the passage of the excrement, but without tubes; the valves

generally ribbed and laminated. *Tridacna, Chama, Isocardia.*

The *Cycladina* have the mantle-lobes free beneath, united behind, and forming an internally double tube, the foot very extensile, cylindrical; the shell very thin and delicate. They reside in fresh water. *Cyrena, Cyclas, Pisidium.*

The *Venerina* have the mantle-lobes free beneath, united behind to form a tube containing two siphons, the foot compressed, extensile; the shell varying in form, convex, concentrically striated, with prominent umbones, and the hinge with from two to four divergent teeth, and elongated lateral teeth. *Lucina, Cyprina, Astarte, Venus, Cytherea, Venerupis.*

The *Cardiina* have the mantle closed, with an opening for the foot, and two extensile tubes, the foot large, compressed, tapering; the shell equivalve, entirely closed, generally very convex, the hinge with central and lateral teeth. *Cardium, Donax.*

The *Tellinina* have the mantle open anteriorly for the foot, and bordered with tentacular appendages, closed behind, but with an aperture for the elongated and separated siphons; the foot much compressed, sharp-edged; the shell various in form, compressed, inequivalve, inequilateral, the posterior end shorter and flexuous; the hinge with one or two small central teeth. *Tellina, Cryptodon.*

The *Solenina* have the animal much elongated, the mantle closed, but with an opening in front for the foot, and forming behind a tube, internally double; the foot conical; the shell long, equivalve, extremely inequilateral, thin, gaping at both ends; the hinge with not more than two small prominent teeth in each valve. *Solen, Psammobia.*

The *Mactrina* have the animal oval or elliptical, with the mantle closed, but open in front for the foot, and forming behind a tube internally double; the foot large, compressed, bent; the shell equivalve, inequilateral, more or less gaping at both ends; the hinge with an oblique triangular depression for the internal ligament, there being also a small external ligament. *Mactra, Lutraria, Amphidesma, Anatina.*

The *Myina* have the mantle closed beneath, open in front for the foot, and forming behind two long, united or separated tubes; the foot small, compressed, tapering; the shell elliptical, oval, or oblong, generally inequivalve, gaping at both ends; the hinge with a concave prominent tooth in one valve, and a corresponding depression in the other, for the ligament. *Mya*, *Lyonsia*, *Montacuta*, *Corbula*.

The *Pholadina*, remarkable for boring into stone, clay, or wood, have the mantle closed and more or less tubular, with an anterior aperture for the foot, which is small, and two elongated coherent tubes behind; the branchiæ elongated, so as to extend into the siphon; the shell generally bare, white, brittle, open at both ends, with the hinge toothless, the ligament external, often with a calcareous plate. *Pholas*.

The *Teredines*, which are remarkable for boring into wood, have their mantle prolonged into a tube much longer than their small rhomboidal valves, and terminated by two very short tubes, of which the base is furnished on each side with a hard and mobile plate. They are very destructive to the timber of harbours, and the planks of ships.

The *Fistulanæ*, *Gastrochænæ*, *Clavagellæ*, and *Aspergilla*, belong to the same series.

CLASS V.—BRACHIOPODA.

The Brachiopoda, fig. 6, are in some respects very similar to the Lamellibranchiata, they being equally furnished with a two-lobed mantle, and a bivalve shell; but they are destitute of a foot, and present, in place of that organ, two fleshy arms, fig. 8, furnished with filaments, and capable of being extended and drawn within the shell, in a spiral form. The branchiæ are not distinct from the mantle, and the mass formed by their viscera is very small. They have no organs of locomotion, but live fixed to submarine bodies. The principal genera are *Lingula*, *Terebratula*, and *Orbicula*.

The *Lingulæ* have a long fleshy stalk, of which one end is generally fixed to a rock, and the other bears two oblong, flattened valves. Their arms, which are attached on the sides of the mouth, are very long; and the branchial vessels are dispersed over the inner surface of the mantle, forming on each side a series of small parallel folds.

The *Terebratulæ* have two unequal valves joined by a hinge; and it is through a hole at the summit of one of them that the fleshy peduncle passes by means of which the animal is fixed. Their branchiæ are less distinct than those of the Lingulæ, and consist of a network of vessels on the inner surface of the mantle; but their muscular system is more developed, and there is in the interior of the shell a small solid apparatus, of which the structure is sometimes very complex, and of which the principal use is to furnish points of attachment to the muscles, and to assist in separating the valves.

The *Orbiculinæ* have a round and conical valve, like that of the Patellæ, while the other is flat, and perforated for the passage of a very small pedicle. Their arms and branchial vessels resemble those of the Terebratulæ.

CLASS VI.—TUNICATA.

The Tunicated or acephalous shell-less Mollusca, fig. 7, differ much from all the rest in their general form, as well as in several important peculiarities of their structure. Their mantle forms a bag, fig. 7, *a*, or a tube open at both ends. Their branchiæ are always small, and never divided into four laminæ. They have neither foot nor arms, and evidently form a passage to certain lower animals which are placed among the polypi in the division of the Zoophytes. Their structure is more simple than that of any other Mollusca, and they live for the most part affixed to submarine bodies.

The *Salpæ* have the most complex structure of all the Tunicata. Their mantle is tubiform, with transverse muscular bands, and enclosed in a transparent cartilaginous envelope. Both are open at each end, and their posterior orifice has a valve, so disposed as to allow water to enter, but not to escape. The mouth is placed in the interior of the tube formed by the mantle, towards its anterior part; and the heart, liver, and other viscera are collected into a small mass near that aperture; the anus is situated pretty far behind, and a single branchia, composed of a membrane transversely plaited, extends obliquely from the upper to the lower wall of the pallial cavity; the water which traverses this tube consequently bathes the respiratory apparatus, and it is by forcibly expelling it that the animal shifts its place. When adult, these animals are free, but at first they are often joined together so as to form a long chain, and swim about a long time in this manner.

The *Simple Ascidiæ* have no locomotory power, but live affixed to rocks. Their mantle has the form of a bag, fig. 7, *a*, with two orifices, fig. 7, *b c*, generally near each other; and the interior of this cavity is lined by the network of branchial vessels. The mouth and the mass of viscera are fixed at the bottom of the branchial sac, and the intestine ends near one of its apertures. Of this extensive series of animals there are numerous genera.

Other Tunicata, very nearly allied to the preceding, live united into a common mass, and are for this reason designated by the name of *Compound Ascidiæ*. A tissue of gelatinous or cartilaginous consistence contains a great number of these little creatures, and presents at its surface a multitude of small six-rayed stars formed by their apertures.

The name of *Botrylli* is given to small aggregated Tunicata, of an oval form, which differ somewhat from the preceding, inasmuch as they have their branchial sac open at both ends, and the anal orifice opening in a central cavity, around which ten or twelve of these Mollusca are grouped in a radiating manner.

Lastly, the *Pyrosomata* are aggregated Mollusca pretty

much resembling the Botrylli in their internal organization, but which are united in very great numbers, so as to form a large hollow cylinder, open at one end only, contractile, and swimming in the sea.

The above account of the Mollusca, chiefly translated from the works of M. Milne-Edwards, a French naturalist remarkable for the extent and accuracy of his investigations, and the clearness and precision of his style, will serve to afford a general idea of the structure and arrangement of these animals. Should one desire to form a more particular acquaintance with them, he has only to examine with care the organs of those species which he may easily procure in any part of the country where he may be placed. A knife, a needle, a small forceps, and a good lens, together with some vessels, are all the apparatus necessary for this purpose. The actions of the living animals may also be observed, by placing the marine species in salt water, the aquatic in fresh water, and the terrestrial in a glass, or on leaves. The best guides are the works of Cuvier, Blainville, Milne-Edwards, and Deshayes. After commencing such an investigation, the student will not likely return to the mere practice of gathering shells, which, however amusing to many, is not a very rational or satisfactory employment.

EXPLANATION OF THE FIGURES.

Plate XX. fig. 1. SEPIA OFFICINALIS.

a b c, the body enclosed by the mantle.
b b, the longitudinal flaps, or fins.
c c, the edge of the bag formed by the mantle.
d, the head.
e e, the eyes.

f g, the arms, or tentacula.
f f, two of the arms longer than the rest, and often called tentacula, or pedicellate arms.
g g, the eight ordinary arms, covered internally with little acetabula, or cups.

Fig. 2. CYMBULIA PERONII.
a, the shell.
b b, the fins, attached to the sides of the head and neck.
c, the head.

Fig. 3. LIMNÆUS STAGNALIS.
a, the spiral shell.
b, the supraoral flap, or veil.
c c, the tentacula.
d, the eyes.
e, the head.

Fig. 4. FUSUS CORNEUS.
a a, the shell.
b, the head.
c c, the tentacula.
d d, the eyes.
e, the proboscis.
f, the respiratory process, or siphon.
g g, the foot.
h, the operculum.

Fig. 5. MYA TRUNCATA.
a, the shell.
b, the siphon-tube.

Fig. 6. TEREBRATULA, showing the two arms.

Fig. 7. ASCIDIA INTESTINALIS.
a, the cartilaginous sac.
b, the upper orifice, for water.
c, the lower orifice, for excrement.

Plate XXI. fig. 8. ANIMAL OF A TURBO.
a a, the foot.
b, the operculum.
c, the proboscis.
d d, the tentacula.
e, the eyes, at the base of the tentacula externally.

f f, the mantle, slit open.
g, the edge of the mantle, over the neck.
h, the branchia.
i, the branchial vein.
j, the heart.
k, the branchial artery.
l, the extremity of the intestine.
m, the intestine.
n, the stomach and liver, in the convoluted part of the body.
o, the oviduct.
p, the cerebral ganglion and nerves.
q, the salivary glands.
r, the fringed membrane which borders the left side of the opening of the respiratory cavity beneath.

Fig. 9. MACTRA STULTORUM.

a a, the left valve of the shell, the right having been removed.
b b, the left lobe of the mantle, lining the valve.
c, the anterior adductor muscle.
d, the posterior adductor muscle.
e, the mouth, and part of the œsophagus.
f, the two oral appendages, or tentacula.
g, the stomach.
h, the elongated appendage of the stomach.
i, the intestine, convoluted in and around the liver.
j, the liver.
k, the large, bent, tapering, compressed foot.
l, the rectum passing through the heart.
m, the end of the rectum.
n, the anus or termination of the rectum.
o, the upper siphon, for the passage of excrement.
p, the lower siphon, for respiration.
q, the branchiæ of the left side.
r, the anterior ganglion.
s, the posterior ganglion.
t, interganglionary nerve.

DIRECTIONS

FOR

COLLECTING, CLEANING, AND ARRANGING

SHELLS.

SHELLS can only be expected perfect when they are found with the animal alive in them, or taken by the dredge or trawling-net from their native beds. Fine specimens, however, are sometimes found adhering to fishermen's lines or nets. After violent storms many shells are often found on the beach, driven from their beds by the agitation of the waters; on such occasions perfect specimens are frequently to be met with. The Conchologist ought, therefore, to avail himself of every opportunity of walking along the beach, immediately after the tide begins to recede. Most of the shells seen in collections, have been picked up dead on the beach, and are therefore seldom *very* perfect, as they have been tossed to and fro by the waves, and either worn or broken. Should they even be driven beyond the reach of the tide, in this situation they are exposed to the continual heat of the sun, by which their colours become faded.

River and land shells are mostly thinner than those of the sea: though this is by no means a general rule, as the Paper Nautilus, some Placunæ, and Pinnæ, which are marine shells, are extremely thin and brittle.

Several of the LAND SHELLS are very beautifully coloured, and elegant in their form, particularly those found in tropical climates. In Africa, they grow to an amazing size, and

would be very unwelcome guests in our house gardens, as they commit great havoc among the esculent plants. The *Achatina Zebra* of Africa, is very frequently found seven inches from the apex to the base. A few of our own land shells are very beautiful; but from their being familiar to us, we look on them with the greatest indifference; for example, Helices Pomatia, arbustorum, and nemoralis.

Marine Shells are to be met with on almost every shore in the known world, but those of warm climates have in general a finer polish, and exceed all others in point of colouring.

Some authors affirm, that the Cypræa tribe abandon their shells every year, to form new ones of a larger size; but this seems rather a doubtful circumstance, and has not yet been satisfactorily explained.

When shells are found with the animal alive, hot water should be poured upon them. The animal may then be easily taken from bivalve shells; but caution is required in the univalves; as should part of it be left in the volutions, it will be almost impossible to extract it; and the shell becomes very offensive.

The instruments used in procuring marine shells are three, namely, the Dredge, the Gangui, and the Rake. The latter two are, however, not so important as the former, which we shall first describe.

OF THE DREDGE.

There is no instrument like the dredge, in point of general utility. It is much used for fishing oysters, and acts upon the bottom of the sea almost like the rake. No naturalist, who lives on the sea-coast, should be without a dredge; and to those travelling in foreign countries, in search of natural objects, it will be found of the utmost utility. It is to be much deplored that so few naturalists think of possessing themselves of this very useful instrument; as by its aid many remarkable animals might be dis-

covered, which inhabit the mighty deep. Indeed we may be said to know scarcely anything of the marine natural history of foreign lands, as few or none of them have been assiduously explored by the dredge. The following is a representation of that instrument.

Fig. 1.

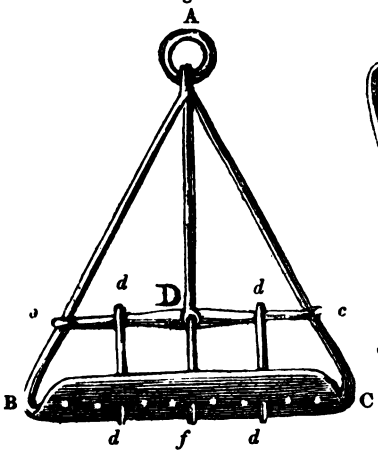
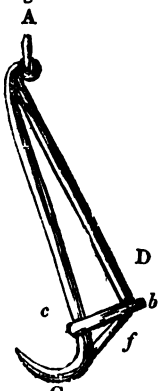


Fig. 2.



To have a clear idea of the dredge, and the parts which compose it, we must imagine a round bar of iron, forged in the shape of an almost equilateral triangle, A, B, C, of the above figure, and having its two extremities joined at A. To form the summit or point of the triangle, each of the sides should be above five feet. The two branches, A B, and A C, are rounded and bent, as they approach the base of the triangle. The base, B C, is forged into a plate, six inches in breadth, with a sharp cutting edge in front, turned upwards at an angle of about sixty degrees. The back, or that part opposed to the edge of the plate, is an inch thick. By

means of the curvature, *b* B, *c* C, figs. 1 and 2, of the two lateral branches, A B and A C, the edge of the plate, B C, is brought forward, and a little turned to the side of the summit, A, as may be seen in the profile of the dredge, fig. 2, A C. This edge makes, with the plane of the triangle, contained between the straight parts of the two descending branches, A B, A C, an angle of about sixty degrees.

There is a large iron ring attached to the summit A. When, by means of a rope passed through this ring, the dredge is dragged along the bottom of the sea, the edge B C, which is turned downwards, rakes the bottom strongly, and detaches from it all the bodies which adhere to it. But it is not enough that these bodies should be detached from the bottom of the ocean; they must also be retained, and raised by means of a net.

This net, attached to the dredge, and which follows it at the bottom of the sea, in order that it may receive within it the bodies that are detached, has the form of a bag. The lower part of this bag, which is intended to drag along the bottom, should be made of untanned hide, so as to resist the friction. The side next the plate should consist of straps of leather, crossing each other like a net, and attached to eight holes in the back of the plate B C, which may be seen in fig. 1. This plate is pierced with eleven holes, but three of them are intended for the reception of three bars, the use of which will afterwards be explained.

The upper part of the net is attached to a rod *b c*, figs. 1 and 2, which crosses the triangle, A B C, parallel to the plate B C, which is distant from that plate about two feet: this rod is round, and nearly two inches in diameter; the two extremities terminate in a flattened end, perforated to receive the two ascending branches A B, A C.

The curvature of this rod removes it from the plane of the triangle, *b* A *c*, in a way contrary to that in which the base of the plate, B C, is removed from it, by means of the curvature of the two ascending branches A B, A C, at their inferior extremities; and these removals in a contrary way, keep the bag always open, of which the edges have been

attached, as we have said, one end to the back plate B C, and the other to the transverse rod or bar *b c*.

This rod must be firmly fixed in its place; for this purpose, it is a little flattened, and pierced in its middle, D, with a hole. A bar, A D, figs. 1 and 2, which comes from the summit A, of the dredge, and which is also flattened and pierced with a hole at its extremity, D, is joined, by means of that extremity, to the middle of the rod, *b c*, on the concave side, so that the two holes are adapted to each other. The extremity of a small cross bar of iron, D *f*, is made to pass these, which issues by the other side of the rod, *b c*, and the bar, A D. The same cross-piece of iron, D *f*, is attached, in a similar manner, by its other extremity, *f*, which is made to pass, that it may be afterwards bent, through one of the holes, with which the back of the plate, B C, is pierced.

This plate, as we before mentioned, is pierced with eleven holes, of which eight only are employed in giving passage to the meshes of the net or bag. These holes are arranged two and two together: an idea of their arrangement, and the use of the three others, may be learned by inspecting fig. 1. That in the middle serves to attach the cross-bar D *f*. The two others serve to attach in like manner, two similar cross-bars, *d d*, *d d*, fig. 1, which strengthen the whole machine, and of which the other extremity is attached to the rod, *b c*, by a kind of hook which embraces that rod.

The bar, A D, and the cross-bar, D *f*, are inclined to one another. By means of this inclination, the bar A D, through which passes the cross bar D *f*, is strongly fixed to the rod *b c*, from which it can be removed only by being elongated. This bar, A D, is a little less thick than the two ascending branches A B, A C; they are, however, nearly two inches in diameter. The three branches, A B, A C, A D, unite again at the summit of the dredge, where they are welded together so as to make only one, whose extremity is bent to embrace the ring, as seen at A, figs. 1 and 2. The common oyster-dredge is smaller than that which we have described, and of a lighter make.

We have still to describe the manner in which this instrument is used for the fishing of shells. A cord is passed through the ring attached to the point of the dredge, another cord is attached to the middle of the rod, *b c*, by a knot which embraces the rod, *b c*, the perpendicular branch A D, and the small cross-bar D *f* at the point where they unite. When the boat has reached the place of fishing, the dredge is thrown out at the stern in the manner in which an anchor is thrown out. The last-named cord serves to keep the dredge in its place, the plate being turned below till it arrive at the bottom of the sea, and to prevent it from being overturned by the way. When the dredge has reached the bottom, it is hauled along by rowing and sailing. Should the dredge be stopped by any rock or irregularity at the bottom, the rope attached to the ring should be pulled. When the bag is supposed to be full, the dredge is drawn on board by the capstan, and the bag is emptied of its contents.

Different species of sea-weed are frequently covered by minute shells. Weeds should always be carefully examined. Many of the smaller and microscopic shells are found at high water-mark among the fine dross and drifted fragments of shells: this sand should be brought home and examined at leisure. To facilitate the process, a small wire-cloth sieve should be made of about six or seven inches square, and all the sand sifted through it; and the shells left. See Plate V., fig. 7.

OF THE DREDGING-BAG.

This is the most simple apparatus for fishing shells. It is a large net in the shape of a bag. The mouth of this bag is kept open while at the bottom of the sea, by means of a stick placed transversely, keeping the margins apart from one side to the other. This stick is equal to the diameter of the aperture of the bag, and as it is placed horizontally, it divides that aperture into two halves, the one inferior, and the other superior. The whole circumference of the lower part is furnished with small pieces of lead, whose weight

draws it down. The circumference of the upper part is provided, on the contrary, with small pieces of cork, which raise it up; thus the bag remains always open at the bottom of the sea. The bag is dragged by means of a rope, which attaches it to a boat, the motions of which it follows. The lead with which the lower part of the aperture is loaded, causes is to drag strongly along the bottom of the sea, the shells and marine plants of which are pulled off, and enter the bag as it is moved forward.

OF THE RAKE.

In many cases, the bag has not sufficient power to detach those shells which adhere strongly to rocks, at the bottom of the ocean; in which case, the rake will be found an efficient instrument.

The rake is composed of a cross-piece of iron, armed with teeth, and attached to a long handle, of a similar form to the rake used by gardeners, except that from the two extremities of the cross-iron proceed two iron branches, which are attached to the handle, and which form, with the cross-piece, a kind of semicircle. This semicircle serves for attachment and aperture to a net, in shape of a bag. This rake is fixed by the end of a handle to a rope, by means of which, fishers, in a boat, draw it in by the help of a capstan. The teeth of the rake drag along the bottom of the sea, and detach the marine bodies which adhere to it; these are received into the net, by means of which they are brought up to the surface.

Land Shells inhabit nearly every country of the globe. They are found in woods, hedges, and gardens, where they take up their residence in the hollows of trees, crevices of rocks, holes in old walls, the roots of hedges, under stones, amongst moss; or adhere to the branches and stumps of trees, and under the shade of leaves, or amongst nettles, or other weeds. It is during the day that they retire to those situations, and in the evening they are met with crawling

abroad; or in the day-time when the weather is moist and rainy.

Fresh Water Shells are to be met with in almost every lake, pond, river, and ditch, either lurking in the mud at the bottom, or crawling on leaves, or on the sides of the lakes, &c In ordinary cases, a tin spoon must be used to search for them; this is like the head of a dredge-box, of four inches and a half diameter, perforated with numerous small holes, not exceeding the sixteenth part of an inch caliber. To this must be attached a handle for the reception of a walking-stick or other piece of wood. With this spoon the Conchologist must rake along the surface of the mud and sand at the bottom of ditches, rivulets, or ponds, and having brought a quantity to the surface, the mud must be washed entirely away, and the shells, if there are any, will remain behind.

For *Anodonta Cygnea*, and other large species, which burrow deep in the mud, a different sort of net is necessary. This consists of an iron triangle of twelve inches, by seven at the base, to which a hollow upright handle is affixed, and in this is inserted a pole of sufficient length to reach the bottom. It must be firmly screwed to the handle. A net of twine or hair-cloth is attached to the triangle. The point of the triangle should be sharp, so that it may the more easily penetrate the mud, through which it must be drawn in situations where shells are likely to exist.

Great deception is practised by some dealers in shells, by which means they easily impose on those who are unacquainted with them. If a shell happens to have the lip broken, they take a common file, and form it anew; by which the character of the shell is often completely altered. Some go so far as even to form a canal, to imitate rare shells, and also counterfeit striæ; when they have accomplished this, they then imitate the external colouring, and finish the whole by a coat of varnish. The shells they thus transform are, in general, worn specimens; though in some instances good shells are sacrificed to obtain their object.

Much might be here said on the arts practised to alter,

patch up, and beautify shells; but this has no connection with the science, and may therefore be omitted, as a naturalist would prefer a worn, or even a broken specimen, to one either altered, or coloured and varnished, by which it can be rendered pleasing to the eye of only the inexperienced in Natural History. Surely the lover of nature must look with contempt on all artificial means employed either to alter or amend the objects of his study. It will be sufficient to point out the means of simply cleaning testaceous bodies.

When shells are perforated by sea-worms, or when any other accidental circumstance occurs to deform a good specimen, it is certainly desirable to use some means to improve it; and for this purpose a cement may be made of fine whitening, flour, and gum; the holes or cracks may be filled up with this composition, and allowed to dry; it should always be a little above the surface, and cautiously scraped down with a knife; when ridges or striæ can easily be imitated, if necessary, with a file or engraving instrument. The parts thus mended may be coloured with common water-colours, and then brushed; or if on a smooth shell, polished with the palm of the hand, and afterwards rubbed over with Florence oil, which should be well dried off with a piece of flannel. If this mode is judiciously managed, the specimen may be examined, and the blemish never discovered.

Many shells, even when obtained alive, are incrusted with extraneous matter: the best and safest means of removing this is, first to steep them in warm water, and then to scrape them with a knife, or start them off with an engraving tool. A little sand paper may also be used, but care must be taken not to injure the shell. When as much of the crust is in this way removed, as can with safety be done, recourse should be had to *muriatic acid*, very much diluted with water; by applying this cautiously with a feather to the places you wish removed, for a very short period, it will soon decompose the extraneous matter. Two minutes at a time is as long as it can with safety be applied, but one

minute's application often has the desired effect. It should then be immersed in cold water, and the parts well scrubbed with a nail-brush and soap. Should the crust not be entirely removed, this process may be repeated, but the greatest care is to be used not to allow the acid to touch the inside, as it will *instantly* remove the fine enamelled surface. Some are so cautious as to melt bees' wax, and coat the parts of the shell they do not wish touched with the acid.

When water is used too hot in the first process, it often makes the fine polished surface crack in a thousand directions.

After the process of corrosion, some make use of flannel or a brush, and emery or tripoly, to polish the shell. This may be done in cases where the polished insides happen to be touched with the corrosive fluid; but in all instances where the places cleared by the acid are of a white or chalky appearance, they should be washed over with Florence oil, and then rubbed hard with flannel or a nail-brush. This mode gives the shell the appearance of nature, and at the same time stops the action of the acid, should any remain in the shell, while it is also of great use in preserving it from decay. It is of great advantage in preserving the epidermis, which often, when it becomes dry from lying long in a cabinet, cracks and quits the external surface of the shell. It would not be amiss to rub shells over with oil once a-year.

This practice of oiling shells I believe I was the first who thought of. I have communicated it to all my friends who collect shells; and it has been generally approved. Indeed one friend, who had a very large collection, was so pleased with the effect it produced, that he washed off the gum from all his shells, and oiled them. The common practice of collectors is, when they obtain a specimen which is a little worn, to coat it over with a solution of gum arabic which certainly heightens the colours; but the gloss is by no means natural, and a judge may in a moment discover the deception. This varnishing system is carried to a great length by some, who have almost every shell in their cabinets daubed over with gum arabic, so that they all shine with

great lustre, even although many of the shells should be dim in their natural state.

Oiling shells has a wonderful effect in restoring their colours, when obscured by the surface being somewhat decomposed, and of a chalky appearance. If not too much decomposed, the spots and colours will have all their original freshness. Shells are composed of animal matter and lime, and when they are decomposed, it is from the animal matter being set at liberty by the action of some acid: consequently, the application of oil is a substitute for the animal matter which they had lost.

SIMPLE METHODS OF ARRANGING CABINETS.

The most simple method of arranging shells in a cabinet, is to place them in boxes or trays made of card-paper. First cut white cards of the size you wish the boxes (if they may be so termed); then take a pair of steel dividers which are fixed with a screw, and set them to the size the depth of the sides is wished; place the card upon a piece of pasteboard, and draw the dividers along the surface, one leg being guided by the edge of the card; press pretty hard so as to make a deep groove; then cut out the corners, and press up the sides, which will be found to stand quite stiff; but if great nicety is wanted, a piece of paper may be pasted on the corners. On the bottom of every box should be written the name of the shell it contains, with its country and habitat; a reference to some author who describes it; and such other remarks as may be thought necessary.

My friend Mr. Nichol, Lecturer on Natural Philosophy, has a remarkably neat method of preserving his shells: it is by attaching conical or raised pieces of cork to pasteboard; they are made to fit as nearly as possible the size of the apertures of univalve shells, which completely prevents them from rolling about in the drawers, and then it has this advantage, that the shells can be taken in the hand and examined on all sides.

Another plan is to attach all the shells to pieces of thick

pasteboard, covered with white paper, so that two sp
of each shell are required to show the species to adv
one side to be turned up, and another down. Th
be attached by the following composition; which is t
mentioned at page 217 for mending shells.

Fine Spanish whitening,	2 oz
Gum Arabic,	2 oz.
Finest flour,	½ oz.
Ox-gall, a tea-spoonful.	

This cement may be kept in a pot in a dry state
little warm water poured on it when required. Som
a solution of gum arabic for attaching them. The s
of gum arabic plain, will not, however, answer the p
as it cracks when the weather becomes hot, and th
are disengaged. It should therefore be made in the fo
manner.

Gum Paste.

White Sugar-candy,	2 oz.
Common Gum Arabic,	4 oz.
Ox-gall, one tea-spoonful.	

When properly dissolved, it should be strained t
fine muslin or gauze, and two table-spoonfuls of st
hair-powder added to it, together with half-a-drachm
rosive sublimate. It may then be put into an earthe
pot or bottle, and allowed to dry. A little warm
poured on it will render it fit for use in a few minut

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TO THE

CLASSES, ORDERS, GENERA AND PLATES

TO ILLUSTRATE THE GENERA.

THE CLASSES ARE PRINTED IN CAPITALS, THE ORDERS IN SMALL CAPITALS, AND THE GENERA IN THE ORDINARY TYPE.

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Callosity, a smooth protuberance.
Callus, a deposition of calcareous matter.
Campanulate, bell-shaped.
Canaliculated, made like a pipe or gutter.
Cancellated, longitudinally and transversely ribbed.
Carinated, having a longitudinal prominence like the keel of a vessel.
Cartilage, a flexible fibrous substance by which the valves are united, situated near the beak.
Cauda, the elongated base of the venter, lip, and columella.
Cicatrix, the glossy impression in the inside of the valves, to which the muscles of the animal are affixed.
Ciliate, edged with parallel hairs, bristles or appendages, like the eye-lids.
Cinereous, of the colour of wood ashes.
Clavate, club-shaped, thicker towards the top, elongated towards the base.
Cochleæ, shells of one piece, univalves.
Cochleate, twisted like a screw or the shell of a snail.
Columella, the upright pillar in the centre of most of the univalve shells.
Commissure, a joint or seam.
Complicated, doubled together.
Compressed, squeezed together perpendicularly, in opposition to depressed, which is flattened horizontally.
Concamerated, arched over, vaulted.
Concamerations, divided into compartments, as in the Nautili.
Concave, hollowed out like a bowl.
Concentric, surrounding a centre.
Conchæ, shells consisting of two or more pieces or valves, bivalves, or multivalves.
Cone, the form of a sugar-loaf.
Confluent, running together.
Conoid, a figure like a cone, sugar-loaf-shaped.
Contorted, twisted, or incumbent on each other, in an oblique direction.
Contracted, shortened, shrunk up.
Convoluted, rolled upon itself, twisted spirally, like a piece of paper rolled between the finger and thumb.
Cordate, heart-shaped.
Cordiform, resembling the form of a heart.
Coriaceous, of a leather-like consistence.
Corneous, of a horn colour, resembling a horn.
Coronal, relating to the crown or top.
Coronated, crowned, or girt towards the apex.
Costated, ribbed, having large ribs.
Corpus, the body of the shell, the last or great wreath in which the aperture is situate.
Cortex, the anterior skin or epidermis.
Crenulated, notched at the margin, scalloped.
Crispated, rough with waving lines or curled.
Cuneiform, shaped like a wedge.
Cylindrical, round like a cylinder or a roller.
Cymbiform, boat-shaped.

D.

Decorticated, worn, divested of epidermis or skin.
Decussated, generally applied to striæ, or lines, which are crossed, or which intersect each other perpendicularly and horizontally.
Deflexed, bent aside.
Dentary, of or belonging to the teeth.
Denticle, a small tooth, such as the tooth of a saw.
Denticulated, set with small teeth, as in Arca.
Depressed, pressed down horizontally, low, shallow, flat.
Dexter valve, the right valve.
Diaphanous, transparent, clear, that can be seen through.
Digitated, fingered or clawed, as in the lobes of the outer lip of the Strombi, &c.
Disk, the middle part of the valves, or that which lies between the umbo and the margin.
Divaricated, straddling, spreading out widely.
Divergent, tending to various parts or directions from one point.
Dorsum, the back: it generally means the upper surface of the body of the shell, when laid upon the aperture or opening. In the genera of Patella and Haliotis,

the back means the upper convex surface.
Dotted, punctured like a thimble.
Duplicated, divided into plaits or folds.
Duplicature, a fold, any thing doubled.

E.

Echinated, bristled like a hedgehog, set with spines.
Effuse, spread out.
Elliptical, having the form of an ellipsis.
Elongated, lengthened, drawn out.
Emarginate, } with the margin or
Emarginated, } edge notched.
Ensiform, sabre-shaped.
Entire, whole, uninterrupted, not divided.
Epidermis, the outer coating or scarf skin of the shell.
Equidistant, being at the same distance.
Equilateral, having all sides alike.
Equivalve, having both valves of equal dimensions.
Exolete, worn or faded.
Exserted, standing out, protruding.
Extraneous, not essentially or naturally forming part of an object.

F.

Falcated, bent or hooked like a scythe.
Fascia, a coloured band.
Fasciated, filleted, or covered with bands.
Fascicled, clustered together as in a bundle.
Fasciculated, consisting of little bundles.
Fastigiate, flat and even at top.
Faux, what can be seen of the cavity of the first chamber of the shell, by looking in the aperture.
Ferruginous, of an iron colour, or rust coloured.
Filament, a slender thread-like process.
Filiform, thread-shaped, slender and of equal thickness.
Fimbriated, fringed.
Fissure, a cleft, a little slit, or narrow chasm.
Flexuous, zigzag, with angles gently winding.
Flexure, a bending.
Fluviatile, of or belonging to rivers, or to fresh water.
Foliaceous, consisting of laminæ or leaves.
Foliated, bent into laminæ or leaves.
Fornix, the excavated part under the *umbo*. It likewise signifies the upper, or convex shell in the *Ostrea*.
Fragile, brittle, easily broken.
Front, in univalves, when the aperture is turned towards the observer.
Furcated, forked.
Furrow, a small trench or hollow.
Fuscated, darkened, obscured.
Fusiform, spindle-shaped, intermediate between the conical and oval.

G.

Gap, or gape, an opening in bivalves when the valves are shut, as in the *Pholades*, *Myæ*, &c.
Gaping, opening widely.
Geminated, marked with a double elevated stria connecting the wreathes.
Geniculate, keeled.
Genus, an assemblage of species possessing certain characters in common, by which they are distinguished from all others.
Genera, the plural of genus.
Gibbous, bulged or bulging.
Glabrous, smooth, having a smooth surface.
Globose, globular.
Granulated, beaded, in small grains or beads.
Groove, a hollow channel.

H.

Hemispherical, in the shape of a half globe.
Hirsute, rough, beset with strong hairs.
Heteroclitical, synonymous with heterostrophe.
Heterostrophe, reversed, applied to shells whose spires turn in a contrary direction to the usual way.
Hispid, with stiff hairs.

I & J.

Jagged, denticulated, uneven, toothed like a saw.

Imbricated, placed like the tiles of a house.
Imperforated, not pierced with a hole, wanting an umbilicus.
Inequilateral, when the anterior and posterior sides make different angles with the hinge.
Inequivalve, where one valve is more convex than the other, or dissimilar in other respects, as in the common oyster.
Inarticulate, not jointed.
Incumbent, one lying over the other.
Incurved, } bent inwards, crook-
Incurvated, } ed.
Indented, unequally marked, hollowed.
Inflated, tumid, swollen, as if blown out.
Inflected, or inflexed, bent inwards.
Intercostal, placed between the ribs.
Internode, the space between one knot or joint and another.
Interrupted, divided, separated.
Interstice, space between one part and another, a crevice.
Intortion, the turning or twisting in any particular direction.
Involucre, a covering.
Involution, that part which involves or inwraps another.
Involute, where the exterior lip is turned inwards, at the margin, as in the Cypræa.
Isabella-colour, a brownish-yellow with a shade of brownish-red.
Juncture, the joining of the whorls in univalve shells.

K.

Keel, the longitudinal prominence in the Argonauta.
Knob, a protuberance, any part bluntly arising above the rest.

L.

Labra, the lips.
Laciniate, jagged or cut into irregular segments.
Lacunose, having the surface covered with pits.
Lamellar, consisting of films or plates.
Lamellated, divided into distinct plates or foliations.
Laminæ, thin plates, laid one coat above another.
Lanceolate, oblong, and gradually tapering like the head of a lance.
Lateral, placed at the side, or extending to one side, from the centre.
Latticed, having longitudinal lines or furrows, decussated by transverse lines.
Lenticulate, doubly convex, of the form of a lens.
Ligament, a solid body, softer than a cartilage, but harder than a membrane, which connects the valves in bivalves.
Limb, the disk of bivalve shells.
Linear, composed of lines, or slender like a line.
Lineate, marked with lines.
Lip, the outer edge of the aperture of univalves.
Littoral, of or belonging to the shore.
Lobated, rounded at the edges.
Longitudinal, in the direction of the length of the shell from the apex to the base.
Lubricity, slipperiness, smoothness of surface.
Lunated, formed like a half moon.
Luniform, in the shape of a crescent.
Lunulated, crescent-shaped.
Lunule, a crescent-like mark or spot, situated near the anterior and posterior slopes in bivalve shells.

M.

Margin, the whole circumference or outline of the shell in bivalves.
Marginated, having a prominent margin or border.
Membrane, a thin filmy body.
Membranaceous, consisting of membranes.
Mottled, clouded or spotted with various colours.
Mucronate, ending in a sharp rigid point.
Multilocular, many-chambered, consisting of several divisions.
Muricated, clothed with sharp spines.

N.

Nacred, pearly, perlaceous.
Nemoral, of or belonging to a wood.
Nitid, glossy.

Nodose, knotty.
Nucleus, a kernel.

O.

Ob, prefixed to words, is used for inversely or inverted; as *obconic*, inversely conic; *obcordate*, inversely heart-shaped.
Oblong, much longer than broad.
Oblong-ovate, between egg-shaped and oblong.
Obsolete, indistinct, not well defined.
Ocellated, applied to eye-like spots.
Ochreous, of the colour of yellow ochre.
Offuscated, darkened, clouded, dimmed.
Olivaceous, of a greenish olive colour.
Operculum, a lid which closes the aperture of some turbinated univalves; and also some of the tops of multivalves.
Orbicular, spherical, circular, round.
Order, the second division of the animal kingdom. Orders are made up of families and genera.
Orifice, an opening or perforation.
Ovate, shaped like the longitudinal section of an egg.
Ovoid, approaching to the shape of an egg.

P.

Palmated, webbed, as in the feet of some water birds.
Papillæ, small dots or pimples.
Papillary, } having the surface
Papillous, } covered with dots or pimples.
Papillose, pimpled, dotted.
Papyraceous, thin as paper.
Parasitical, living on some other body or animal.
Parietes, the walls of a shell.
Patulous, with a gap or opening.
Partitions, calcareous processes, dividing the shells of the genus Nautilus, Serpula, &c.
Pectinated, resembling the teeth of a comb.
Pedicle, the support of the Lepas Anatifera and its corresponding species, by which they are attached to wood, &c.
Peduncle, a foot-stalk or tube on which any thing is seated.
Pediform, foot-shaped.
Pelagic, belonging to the deep sea.
Pellicle, the skin or film.
Pellucid, transparent, clear.
Peltate, shield-shaped, orbicular and attached by a central pedicle.
Pentagonal, having five angles.
Perforated, pierced with holes.
Perlaceous, of or like mother-of-pearl.
Pervious, admitting passage.
Phosphorescent, emitting light in the dark.
Pillar, in univalves is the internal continuation of the columella, or inner lips, and extends from the *base* to the *apex*.
Pinnated, winged.
Plaited, folded.
Plaits, folds.
Plicated, folded or plaited, as in the pillar of the volute tribe.
Plumose, having a feathery appearance.
Polythalamous, divided into several chambers.
Porrected, projecting.
Prismatic, generally applied to the colours of shells, being like those of the prism; iridescent.
Produced, lengthened out.
Protrude, to thrust forward.
Protuberances, parts higher or more elevated than the parts adjoining.
Punctulated, with small hollows like the punctures of a thimble.
Pyriform, pear-shaped.

Q.

Quadrangular, having four right angles.
Quadriplicated, having four plaits.

R.

Radiated, furnished with rays.
Radicated, is when the shell is fixed by the base to another body.
Rectangular, having right angles.
Recurvated, turned backwards.
Recurved, bowed back.
Reflected, thrown backwards, or bent back.
Reflex, } the same as *recurvated*.
Reflexed, }
Refracted, abruptly bent, as if broken.
Reniform, kidney-shaped.

Repand, with a waved margin.
Replicated, folded or plaited, so as to form a groove or channel.
Reticulated, formed like a piece of net-work.
Retroflected, bent backwards.
Retrorse, bent back.
Retroverted, turned back.
Retuse, ending in an obtuse sinus.
Reversed spire, is when the volutions turn the reverse way of a common cork screw, or to the sun's apparent motion.
Revolute, rolled backwards.
Ribbed, having longitudinal, or transverse ridges.
Ridge, the upper part of a slope.
Rima, a chink or interstice.
Rostrum, the beak; the extension of the shell, in which the canal is situated.
Rotund, round, circular, spherical
Rotundated, blunted, or turned at the edge.
Rudimentary, small, undeveloped; generally applied to the indistinct teeth of shells.
Rufous, of a reddish colour.
Rugose, rugged, full of wrinkles.

S.

Sanguineous, of a blood colour, or resembling blood.
Scabrous, rough, rugged, harsh, or like a file.
Scalloped, indented at the edges.
Scrobiculus, a depression or cavity.
Scrobiculate, pitted, having the surface covered with hollows.
Scutellated, } shield-shaped.
Scutelliform, }
Seam, the line formed by the union of the valves.
Semi, is used in composition in the sense of half.
Semi-cordate, half heart-shaped.
Semi-cylindrical, half cylindrical, cut through lengthways.
Semi-orbicular, the shape of a half globe.
Semi-lunar, the shape of a half moon.
Semi-pellucid, somewhat pellucid, or shining.
Septiform, in the shape of a partition.
Serrated, like the teeth of a saw.
Serrulated, very minutely serrated.
Sessile, sitting or seated; without a stalk.
Seta, a bristle.
Setaceous, bristly, covered with bristles.
Setiferous, bearing bristles.
Setose, covered with bristles.
Sinister valve, is the left valve.
Sinus, a groove or cavity.
Siphon, a cylindrical tube.
Siphunculus, a cylindrical canal perforating the partitions in polythalamous shells; for instance, as in the *Nautilus Spirula*.
Solitary, generally applied to a single tooth in bivalves.
Spathulate, rounded and broad at the top, and becoming narrow like a spatula or battledore.
Species, the division of a family or genus, containing such as agree with it in generic characters; or such as are derived from one common parentage.
Spiny, thorny, covered with thorn-like processes.
Spinous, having spines like a hedge-hog.
Spire, all the whorls of univalve shells, excepting the one in which the aperture is situated, which is termed the *body*.
Spiral, twisted like a cork-screw.
Squamose, scaly.
Stellated, starred, consisting of star-like figures.
Striated, scored, or covered with fine thread-like lines.
Sub, in composition, means almost, or approaching to; as sub-globose, somewhat globular.
Sub-arcuated, somewhat arched.
Sub-conic, somewhat conical.
Sub-diaphonous, somewhat transparent or clear.
Subrotund, nearly globular.
Subulate, awl-shaped.
Sulcated, furrowed.
Sulci, furrows or ridges.
Summit, the tip or apex.
Suture, a hollow line of division in univalve shells, the spiral line of which separates the wreaths.

T.

Tentacula, the feelers of snails, which inhabit shells.
Tesselated, chequered like a chess board.
Testacea, the third order of worms, including those which are covered with a testaceous shell.
Testaceous, consisting of carbonate of lime and animal matter.

Tetragonal, four cornered.
Torose, swelling into knobs or protuberances.
Tortuosity, wreath, flexure.
Tortuous, twisted, wreathed, winding.
Transverse, placed across, or crossways. When the breadth of a shell is greater than its length, it is called transverse.
Trapeziform, shaped like a trapezium.
Trigonal, having three angles.
Truncated, stunted, cut short or abruptly off at the end.
Tubercle, a little knot or pimple.
Tuberculated, knotted, pimpled.
Tuberosities, prominent knots or excrescences.
Tubicolar, inhabiting a tube.
Tubular, in the shape of a hollow tube.
Tubulate, tubulous or hollow.
Tunicated, coated.
Turbinated, shaped like a top or pear.
Turgid, swollen.

U & V.

Valve, a distinct piece or part; the whole of univalve shells, or shells in one piece; and the half of bivalves, or shells in two divisions, &c.
Varices, longitudinal thick ribs in univalve shells.
Variety, is when one species differs some little degree from that of another.
Vaulted, arched, like the roof of one's mouth.
Venter, the belly, situated in the body of the shell; being the most prominent part, when the aperture is turned to the observer.
Ventral, belonging to the belly.
Ventricose, inflated, swollen in the middle.
Verniform, worm-shaped.
Vertex, in the Patella the top or most prominent part, situated in general nearly in the middle. In the genus Bulla it is used for the apex.
Verrucose, warty.
Verticillate, whorled.
Umbilicated, having a depression in the centre like a navel.
Umbo, in bivalve shells, the prominent part which turns over the hinge.
Umbonate, bossed, having a raised knob in the centre.
Undulated, waved, having a waved surface.
Ungulate, shaped like a horse's hoof.
Unilocular, with a single chamber or compartment.
Univalve, shells consisting of one valve, or piece.
Volutions, the wreaths, or turnings of the shells of univalves.
Urceolate, swelling in the middle like a pitcher.
Vulva, a mark in several bivalve shells; formed when the valves are united on the posterior and anterior slopes.

W.

Whorl, one of the wreaths or turnings of the spire of univalves.

Z.

Zigzag, having contrary turnings and windings.
Zoned, surrounded with one or more girdles.

GLOSSARY

OF TERMS USED IN CONCHOLOGY.

A.

Abbreviated, shortened, cut short.
Abdomen, the belly.
Aculeated, furnished with, or ending in, prickles.
Acuminated, ending in a sharp point, sharp-pointed.
Adnate, adhering or growing together, adjoining.
Alated, winged, applied to the expanded lip of the Strombus genus, &c.
Ambitus, the circumference or outline of the valves.
Annulated, formed of or divided into distinct rings.
Annulations, rings.
Antiquated, longitudinally furrowed, but interrupted by transverse furrows, as if the shell had acquired new growth at each furrow.
Aperture, the mouth or opening of the shell.
Apex, the tip or point of the spire.
Apophysis, an excrescence.
Approximating, approaching near to, or near together.
Arcuated, bent in the form of an arch.
Arcuations, bendings, curvings.
Area, the surface contained between lines or boundaries.
Arenose, sandy.
Areola, a small area or circle.
Articulations, junctures, or joinings.
Attenuated, thin, slender.
Auricled, having appendages like ears.
Auriform, ear-shaped.
Aurited, eared, having ears as in the scallops.

B.

Barb, filaments resembling a beard.
Base, in univalves, that part of the shell by which it is affixed to rocks, &c. or the opposite extremity to the apex.
Beak, the continuation of the body of univalves in which the canal is situate.
Beard, the filaments by which some bivalves adhere to rocks, &c.
Bellying, distended in the middle.
Bi, prefixed to any word, signifies two.
Biangulated, having two corners or angles.
Bicuspid, having two points.
Bidentate, having two teeth.
Bifid, opening with a cleft.
Bifarious, parting in opposite directions.
Bilabiate, furnished with two lips.
Bilobate, divided into two lobes.
Bimarginate, furnished with a double margin as far as the lip.
Biradiate, having two rays.
Bivalve, consisting of two valves or pieces.
Blotched, spotted in an irregular way.
Blunt, obtuse, opposed to acute.
Borer, a piercer.
Brinded, streaked.
Bulging, gibbous, swollen out.
Bullate, of a blistered appearance.
Byssus, a beard, or tuft of filaments, common in Mytilus and Pinna.

C.

Calcareous, relating to lime, of a limy nature.

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